



Technology Plan Report

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PREFACE

This *Technology Plan* is the culminating document of the three-phase planning study facilitated by CELT Corporation, Marlborough, MA in cooperation and numerous Providence Public School staff. The first phase of the study involved investigation, data gathering, and analysis of current information regarding the deployment of technology in schools for instruction and management, status of curriculum and assessment initiatives, technology support services, equipment and infrastructure inventories, staff development practices, technology standards, policies, and procedures.

Phase two of the study focused on a comprehensive review of findings and the drafting of recommendations for action. As result of intensive review was the production of a document, the *Technology Audit Report*. Phase three was concerned with the development of system design features and implementation approaches for addressing the needs of the school district for improved teaching and learning. The resulting plan for action provides direction for a three-year period for the Providence School District (PSD).

This document is comprised of the following three sections plus appendices:

Section 1: Planning Foundations – Provides commentary on the role of technology in the changing educational environment, describes the overall design of the technology planning process, offers a technology vision for the Providence School District, and identifies strategic planning goals and strategic design decisions.

Section 2: Technology Blueprint – Includes rationale, major findings, major initiatives, and implementation approaches for the blueprint components listed below:

- Curriculum and Assessment
- Learning Technologies
- School Facilities and Learning Environments
- Communications and Network Infrastructure
- Administrative Computing and Decision Support
- Human Resource Management and Organizational Development
- Standards, Policies, and Procedures
- District-, School-, and Program-level Planning
- Community Involvement

Section 3: Implementation Resources – Consists of monitoring and evaluation design, estimated budget, and a multi-year action plan.

Appendices – Contains the following resources:

- Student Technology Competencies
- Instructional Unit Plan Model

- Staff Technology Competencies
- School-Based Assessment Rubric
- Acceptable Use Policy

OVERVIEW

Background

The Providence School District (PSD) is undergoing a major transformation to:

- increase student achievement
- create capacity for supporting and nurturing effective learning environments,
- strengthening parent and public engagement.

There are extraordinary challenges poised by the external environment that increase the demand for accountability. Further, a wide array of internal challenges must be addressed if the performance of the Providence School District is to improve. Among the internal challenges is the need to improve communications. Without an effective communications system, sharing of best practices, monitoring of progress indicators, and building support for improvement initiatives are extremely difficult.

Another major internal challenge is the equitable provision of quality instructional resources targeted to meet the needs of the District's disadvantaged student population. Investment in the infrastructure and technology resources for the delivery of instructional content as well as to support effective management at the classroom, school, and central levels is essential to the transformation. The *Technology Plan* serves to guide that investment as well as the implementation of major initiatives in support of the District's goals.

Technology Plan Structure

The complete *Technology Plan* has three major sections as described below:

- Section I: *Planning Foundations*
Describes the overall design of the planning process and offers a Technology Vision for the Providence School District.
- Section II: *Plan Blueprint*
Includes current status, major initiatives and implementation guidelines for the plan components below:
 - Curriculum and Assessment
 - Learning Technologies
 - School Facilities and Learning Environments
 - Communications and Network Infrastructure
 - Administrative Computing and Decision Support
 - Human Resource Management and Organizational Development
 - Technology Standards, Policies, and Procedures
 - District-, School-, and Program-level Planning
 - Community Involvement

- Section III: *Action Plan*

Provides three-phase matrix for major initiatives along with a schedule for all activities, locus of responsibilities, and alignment with the District's strategic goals.

A multi-year budget for technology is also offered in the full plan. An overview of sections I and II are offered below. The complete plan will soon be available in the District website.

Section I: Planning Foundations

Planning Methodology

Several overlapping strategies, both qualitative and quantitative were used in the development Technology Plan. Information contributing to the development of the plan was obtained through:

- interviews, focus groups, and site visits conducted with approximately 300 stakeholders including school district central office staff, school principals, teachers, support staff, and students
- surveys of school principals
- review of technology-related district documents
- best practices research

Vision

In response to mandates for improved teaching and learning and state education reform efforts in most major disciplines, the District has developed learning standards and assessments for various disciplines. These reforms address the need for Providence's students to:

- access, analyze, and communicate information
- think critically and creatively
- work cooperatively and productively with others.

The effective integration of technology into the Providence School District will both significantly increase student achievement and prepare students to enter and lead our technology-centered society.

There is much evidence that clearly indicates the power of new technologies to impact education. School improvement programs that infuse new technologies into instruction, assessment, and school management yield positive results.

By the year 2005, a blend of powerful computing devices (i.e., multimedia workstations, personal digital assistants [PDAs], hand held calculators) capable of delivering state-of-the-art educational support will be available in each classroom and library/ media center of the elementary and middle schools and in amply resourced specialized arenas for all high school students. Fundamental classroom needs for adequate power, wiring, and circuit protection will have been met. Student access to technology will be virtually one learner

per device as needed to meet educational objectives. Classroom learning environments in Providence will change to accommodate new strategies for collaboration and investigation using emerging technologies.

Teachers will have additional flexibility, through technological support, for addressing multiple intelligences, multi-disciplinary approaches, and child-centered learning. Educators will have access to easy to use systems that accommodate curriculum mapping and that link learning standards and benchmarks to student information, learning resources, lesson plans, and assessment strategies. Educators will also have access to master teacher/mentors through technology.

Professional development for enhancing staff technology competencies will be ongoing, utilizing on-line resources, tutorials, and distance learning models. On site support for technology will be available as needed.

All students will acquire competencies on effective use of computers and other technologies in achieving and exceeding curriculum expectations according to an appropriate developmental timeline. Learning will become more engaging.

Students will acquire and demonstrate effective presentational skills for a variety of audiences using various forms of multi-media and two-way inter-classroom and inter-school broadcasting. They will be more motivated learners, have higher self-esteem, and gain the skills and confidence required in the workplace.



Students will have access beyond the school day to course expectations, assignments, and other resources. Using web-based approaches, school leadership will be able to readily inform and query the public on important issues.

Virtual learning environments will address the need for anytime, any place learning by students and staff.

Fax, voice-mail, and expanded telephone access will improve internal communications, reduce the need for meetings, and provide the time and opportunity for teachers to share successful practices and learn from each other. Exemplary lessons and instructional units will be made available online to support the exchange of ideas and teaching approaches.

Administrative efficiency and communications will be enhanced through system wide e-mail systems, electronic bulletin boards, electronic calendaring, and distributed access to appropriate decision-making data and information. Electronic calendaring will enable individuals to book meeting spaces, examine schedules, and suggest meetings electronically.

Fulfillment of this Vision will help all Providence students make full use of their learning potential, explore new frontiers, and contribute to society, and, through this preparedness, contribute to the future economic development of the city and region.

Section II: Technology Plan Blueprint

Curriculum and Assessment

Providence's schools must augment and transform teaching and learning with technology to promote new teacher and student behaviors.

<i>Highlights and Major Strategies</i>	<i>Phase 1</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Key Results</i>
<ul style="list-style-type: none"> • Develop a set of K-12 student technology standards, differentiated by grade level. 	✓			✧ K-12 student technology competencies are adopted and are being integrated into curriculum areas
<ul style="list-style-type: none"> • Identify and adopt strategies, processes and structures for systematically integrating technology into the curriculum. 		✓		✧ Technology resources, support systems, and professional development will be coordinated for enhancing instructions in K-12 classrooms.
<ul style="list-style-type: none"> • Identify and expand successful curriculum/technology integration practices currently in Providence Schools. 	✓			✧ Processes are in place for teachers to document and share successful practices for using technology in teaching.
<ul style="list-style-type: none"> • Employ technology enhanced strategies where appropriate to support instruction for the bilingual population and their families. 		✓	✓	✧ Technology applications will be deployed that target the specific needs of bilingual students.
<ul style="list-style-type: none"> • Identify components for a decision support system that includes a web-based curriculum development and learning management system to link curricular, instructional resource, assessment, and student information 		✓		✧ PSD teachers have web-access to critical and timely information on student achievement, assessments, and resources that help them plan instruction.
<ul style="list-style-type: none"> • Implement strategies for providing teachers with current student information to help inform decision-making and improve instruction. 		✓		✧ On-line learning plans for all students will inform teachers, parents, and students themselves of strategies for improved learning.

Learning Technologies

Curriculum decisions should be the driving force behind the selection and use of hardware, software, and network solutions. Schools embracing this strategy in their planning will develop a meaningful and shared vision as well as pathway to achieve desired results.

<i>Highlights and Major Strategies</i>	<i>Phase 1</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Key Results</i>
<ul style="list-style-type: none"> Acquire instructional computers to attain a student-to-computer ratio of 5:1 with peripherals in accordance with a procurement and allocation schedule that addresses equity of access issues district-wide. 	✓	✓	✓	✧ All students have high levels of access to appropriate technologies in classrooms
<ul style="list-style-type: none"> Acquire and implement low-cost alternatives to desktop computing devices (i.e., personal digital assistants [PDAs], text processors) and resources that have proven successful in supporting curricular goals, improving literacy, and increasing student achievement on state assessments. 	✓	✓		✧ A blend of computing devices to include battery-powered text processors is available in classrooms in writing instruction.
<ul style="list-style-type: none"> Provide one multimedia computer to each teacher, or team of teachers, with readily accessible projection capability via data projector or large monitors in classrooms. 	✓	✓	✓	✧ Teachers are confident users of technology in small and large group instruction.
<ul style="list-style-type: none"> Identify and promote a variety of technology supported solutions and strategies for students at-risk which provide interventions during and beyond the standard school day. 		✓		✧ Students in all special programs have access to digital content and technology-enhanced learning.
<ul style="list-style-type: none"> Standardize on a core set of software applications beyond the productivity suite that the District is able to support with professional development offerings and on-going integration/ implementation assistance. 		✓		✧ Teachers will have appropriate software to support the curriculum goals.
<ul style="list-style-type: none"> Complete WAN installation across the district and increase bandwidth to schools to support high-speed Internet access 		✓	✓	✧ The bandwidth to each school is sufficient to support teachers and learners and to provide access to quality educational resources.

School Facilities and Learning Environments

Designing and building appropriate technology-enriched learning environments appropriate for the primary to adult learner to address educational needs and priorities is of critical importance to the Providence School District.

<i>Highlights and Major Strategies</i>	<i>Phase 1</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Key Results</i>
<ul style="list-style-type: none"> Connect all classrooms and computers to the PSD networks. 		✓	✓	<ul style="list-style-type: none"> ✧ Schools are fully equipped with appropriate technologies, wiring, and access to the wide area network.
<ul style="list-style-type: none"> Examine all instructional areas in respect of the need for accessing viewing computer information, and develop a solution for typical instructional scenarios. 		✓		<ul style="list-style-type: none"> ✧ Electrical capacity in all schools can support current and future requirements for technology. Classroom teachers are able to effectively project computer output for group instruction.
<ul style="list-style-type: none"> Allocate a permanent, dedicated location at each school from which all cabling operations and network operations can occur. 		✓	✓	<ul style="list-style-type: none"> ✧ Networks are reliable and robust.
<ul style="list-style-type: none"> Consider the use of wireless technologies to provide network access in selected classrooms. 	✓	✓	✓	<ul style="list-style-type: none"> ✧ Many classrooms are able to establish “instant” computer labs for instruction using wireless technologies.
<ul style="list-style-type: none"> Develop a consistent standard for the amount and type of technology in the typical classroom at each grade level and/or discipline. 		✓	✓	<ul style="list-style-type: none"> ✧ Schools will effectively use current technology to support their unique curricular and administrative needs.
<ul style="list-style-type: none"> Implement a phased approach focused on transforming school libraries into information resource centers. 			✓	<ul style="list-style-type: none"> ✧ School libraries become resource centers for electronic information.

Communications and Network Infrastructure

Not only must Providence's education system have a network that meets user's communications requirements in a cost effective manner, but the network must also be able to expand and evolve to meet rapidly changing needs.

<i>Highlights and Major Strategies</i>	<i>Phase 1</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Key Results</i>
<ul style="list-style-type: none"> Connect all remaining schools to a District WAN and consolidate the existing PSD networks into one. 		✓	✓	✧ Communications district-wide are more immediate, effective, and cost efficient.
<ul style="list-style-type: none"> Assign the function, roles, and responsibilities for District website development and the establishment of standards for program, school, and classroom websites. 		✓	✓	✧ Parents and community members are better informed on district, school, and classroom issues.
<ul style="list-style-type: none"> Develop and implement policies and procedures for providing all staff and students with individual network accounts. 		✓	✓	✧ Students in all schools have reliable access to the Internet for educational purposes.
<ul style="list-style-type: none"> Use the infrastructure for the delivery of resources for teaching and learning, administrative efficiencies and advancing communication on all levels. 		✓	✓	✧ Information flow throughout the district is organized, reliable, effective, and secure.
<ul style="list-style-type: none"> Expand and use the video infrastructure to support full range of traffic including digital or streaming format and two-way communications. 		✓	✓	✧ E-learning opportunities are expanded and access to rich educational resources is available in all classrooms.
<ul style="list-style-type: none"> Provide staff with voice mail services. 			✓	✧ Home-school communications are enhanced through an expanded telephone system.



Administrative Computing and Decision Support

A goal of administrative and decision support resources is to provide District administrators, teachers, and school staff members with applications that increase their effectiveness in helping children to achieve high standards and be prepared for tomorrow's workplace.

<i>Highlights and Major Strategies</i>	<i>Phase 1</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Key Results</i>
<ul style="list-style-type: none"> • Procure a data warehouse that integrates and enhances existing databases and operational systems. 		✓	✓	✧ Redundant data entry is reduced; accuracy of district data is improved.
<ul style="list-style-type: none"> • Develop and implement standards, policies and procedures to replace manual form reports and data duplication with electronically managed data over the District-wide network. 			✓	✧ Forms-based processes are more efficient and paperwork is greatly reduced.
<ul style="list-style-type: none"> • Select and deploy appropriate user tools that can access the data warehouse to support the information and reporting needs of learning communities and the classroom in addition to federal, state, district, and school needs. 		✓	✓	✧ Information district-wide is more accessible and reliable; state and federal reporting is more accurate and easier to accomplish.
<ul style="list-style-type: none"> • Provide upgrades to the REG 2000 system. 		✓	✓	✧ The informational requirements of the "No Child Left Behind" legislation are more readily addressed.
<ul style="list-style-type: none"> • Develop specifications for an inventory/fixed asset management system that integrates with existing administrative systems for finance, procurement, and inventory modules in the Lawson application. 			✓	✧ Procurement is facilitated; resource allocation is enhanced.

Human Resource Management and Organizational Development

Human resources deliver both support and direct services to children. They must be of the highest caliber possible. Ideally, professional development includes education, training, and support.

<i>Highlights and Major Strategies</i>	<i>Phase 1</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Key Results</i>
<ul style="list-style-type: none"> Identify technology competencies and performance levels for teachers, instructional support staff, library-media specialists, administrators, clerical staff, and technical support personnel. 		✓	✓	✧ Expectations regarding technology skills for teachers, library-media staff, and administrators are clear.
<ul style="list-style-type: none"> Encourage more teachers and principals to participate in the Department of Education/University of Rhode Island RITTI program to build their technology competencies. 	✓	✓	✓	✧ Teachers and principals will be more effective in using technology in their professional roles.
<ul style="list-style-type: none"> Expand delivery models for technology-related staff development to make more learning options and time frames available for staff. 		✓	✓	✧ A variety of professional development delivery systems and resources are made available to instructional staff to provide convenient options for improvement.
<ul style="list-style-type: none"> Develop and implement a competency-based Individual Staff Development Plans (ISDP). 			✓	✧ Teachers, administration, and support staff will have access to information to guide their individual professional planning.
<ul style="list-style-type: none"> Establish district-wide guidelines and standards of service for both school-based and district-level technology support services. 			✓	✧ Maintenance and repair services are more responsive to the needs of end-users.
<ul style="list-style-type: none"> Engage in function-based organizational analysis to determine optimal structure and staffing for district-level technology support services and to clarify roles, relationships, and critical interdependencies. 		✓		✧ Overall support of district technologies is more efficient and effective.
<ul style="list-style-type: none"> Implement a student leadership program to supplement school-based technology support. 			✓	✧ Student technology leadership programs provide on-site technical support in schools.

Technology Standards, Policies, and Procurement

Technical standards, specifications, and procurement procedures are necessary to realize economies of scale, efficiencies of human resource development, and the establishment of an effective customer support system.

<i>Highlights and Major Strategies</i>	<i>Phase 1</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Key Results</i>
<ul style="list-style-type: none"> • Adopt a process for periodically reviewing and setting standards for all major technology components including workstations, peripherals, networks, and system software. 		✓	✓	<ul style="list-style-type: none"> ✧ A standards-setting process is in place to guide technology procurement and upgrades.
<ul style="list-style-type: none"> • Encourage policies and procedures at the school level for increasing student access to computers in libraries, labs and classrooms throughout the school day and after school hours. 			✓	<ul style="list-style-type: none"> ✧ Student access to technology is expanded; equity of opportunity is improved.
<ul style="list-style-type: none"> • Develop clear policies, standards of service, and procedural guidelines regarding installation of new instructional technology equipment, upgrading and maintenance of older equipment, and phasing out of obsolete equipment. 			✓	<ul style="list-style-type: none"> ✧ Installation and maintenance of instructional technology equipment is efficient and systemic.
<ul style="list-style-type: none"> • Establish a system to monitor and enforce compliance with technology procurement guidelines. 			✓	<ul style="list-style-type: none"> ✧ Technology procurement is efficient and ensures compliance with established standards.

District-, School-, and Program-level Planning

Each school and program needs appropriate models, tools, guidelines, and materials to facilitate meaningful planning. Further, the District needs to provide professional development, support, and oversight to ensure that planning all levels aligns with district priorities and approaches.

<i>Highlights and Major Strategies</i>	<i>Phase 1</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Key Results</i>
<ul style="list-style-type: none"> Review and assess the established criteria and processes for developing and reviewing Providence One Plans (POP). 	✓			✧ An improved, more effective model for school planning will be implemented.
<ul style="list-style-type: none"> Develop a web-based planning tool to facilitate the development, review and analysis of Providence One Plans district-wide. 		✓		✧ Schools accomplish school improvement planning more efficiently and action plans are data driven.
<ul style="list-style-type: none"> Customize the web-based school planning tool to accommodate the needs of specific district programs or departments. 			✓	✧ Programs and departments within the Providence School District plan strategically for improved services.



Community Involvement

The success of any education system is dependent upon the degree to which the community-at-large supports that system. Technology can provide better and more diverse vehicles and opportunities for parents, the business community, and higher education to see the schools' work in progress and study first-hand the information that they use to hold the system accountable for results.

<i>Highlights and Major Strategies</i>	<i>Phase 1</i>	<i>Phase 2</i>	<i>Phase 3</i>	<i>Key Results</i>
<ul style="list-style-type: none"> • Increase parental involvement and communication using multiple strategies such as telephone, voice messaging, Internet, web posting, and e-mail. 		✓	✓	✧ Parental involvement in their children's' education is increased through improved communication.
<ul style="list-style-type: none"> • Seek ways to increase the number of technology-based community learning programs. 			✓	✧ Community education programs that use technology are more available.
<ul style="list-style-type: none"> • Continue to implement the Registration Center Plan and evaluate its success on an annual basis. 	✓	✓	✓	✧ The registration process is more efficient and student/family data more accurate.
<ul style="list-style-type: none"> • Develop a comprehensive public information and internal communications plan for technology-related information. 	✓			✧ The public is better informed about the need for technology in learning environments and becomes more supportive in this area.

Budget Summary

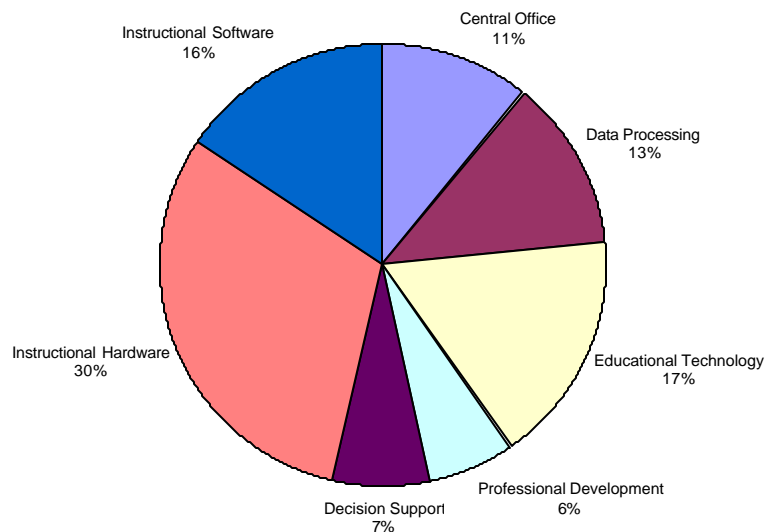
Below it provides estimated budget figures for purchasing, installing, operating, and supporting the proposed technology system for three phases (each phase being a year or more), assuming implementation of provisions listed in the Technology Plan.

Budget Category	Phase 1	Phase 2	Phase 3	Three-Phase Total
Central Office - General (staffing, equipment, licenses, maintenance)	\$ 544,020	\$ 551,095	\$ 558,524	\$ 1,653,639
Data Processing (equipment, licenses, maintenance)	\$ 619,908	\$ 619,908	\$ 619,908	\$ 1,859,724
Education Technology (staff, communications, equipment, maintenance)	\$ 835,561	\$ 553,456	\$ 413,380	\$ 1,802,397
Central Office - Instructional Technology (professional development)	\$ 309,395	\$ 309,395	\$ 309,395	\$ 928,185
Decision Support System Development	\$ 350,000	\$ 350,000	\$ 350,000	\$ 1,050,000
Building Level (instructional hardware, servers, phones)	\$ 1,517,075	\$ 1,517,075	\$ 1,517,075	\$ 4,551,225
Building Level (software, instructional media)	\$ 765,917	\$ 765,917	\$ 765,917	\$ 2,297,751
Total	\$ 4,941,876	\$ 4,666,846	\$ 4,534,199	\$ 14,142,921

This budget intentionally does not mandate specific configurations of equipment. It is expected that schools will choose a range of equipment, power, and capabilities for its classrooms, teachers, and administrators. Further, decisions regarding deployment, location, and distribution should remain school-based.

The figure below offers an analysis of proportionate costs for developing and operating PSD's technology system based on the estimated budget.

Phase I Budget Summary



Funding Sources

Some funding considerations:

- Technology-related staffing has been historically included in District budgets.
- Professional development has been funded in other budgets, although expansion in regard to technology is needed.
- Title I funding might accommodate some instructional hardware and software.
- Instructional software and media costs may be accommodated to an extent by existing budgets for curricular resources.
- Some budgetary items may be covered by federal E-rate program.
- Grant opportunities may be available to defray some costs (i.e., No Child Left Behind, National Science Foundation).

Plan Monitoring and Evaluation

Providence School District leadership will review the Technology Plan to identify and prioritize key activities and outcomes. **Plan monitoring** will review adherence to defined tasks, deliverables, and timelines. **Plan evaluation** procedures will:

- identify specific goal-related strategies
- identify benchmarks for each strategy
- select measures and methods

- gather and analyze information
- communicate results

Due to limited resources, not all proposed plan outcomes can be effectively evaluated. The District needs to be selective. Monitoring and evaluation strategies will be organized in various grade-level groupings (i.e., early elementary, upper elementary, secondary). A District Technology Advisory Team will conduct the monitoring and evaluation, determine which plan activities are to be carried over from phase to phase, and oversee the updating of the Technology Plan.

Benefits to Providence

Many of the technology implementation strategies identified in the Plan contribute directly to the goals of creating and supporting effective standards-based learning environments and development of 21st century skills for all learners. Numerous other technology implementation strategies proposed in the Plan contribute effectively to the transformation of the education system to better meet the needs of the new millennium learners.

- The adoption of K-12 student technology standards and embedding these within statewide academic standards are a critical foundation. As teachers become increasingly competent at curriculum/technology integration approaches, activities for sharing of successful practices across the District will have even more impact.
- Identification of software that aligns with District learning standards has potential for improving student performance in various disciplines.
- The acquisition of a web-based curriculum development and learning management system to provide decision support to teachers in their design of instruction based upon timely and accurate data regarding student performance could enhance instruction across the state.
- The availability of current technology and online resources in classrooms for students to participate in effective educational experiences will expand the potential for learning for independent learners and reluctant learners as well.
- Improved teacher preparation will result from professional development programs that are aligned with identified competencies for staff. The expanded use of technology in the delivery of professional development and leadership training will increase participation and the tracking of results.
- Improved data-driven decision making at all levels is an expected result of expanded bandwidth, upgraded administrative applications at all levels, and effective and enforceable standards and policies.



- Improved electronic communications throughout the District will bring the most effective information and resources to schools from other schools, districts, state agencies, and national sources. Data for the monitoring and evaluation of educational initiatives will be readily collected and analyzed for improved accountability.
- The establishment of home/school electronic linkages will bring the families and community resources into an effective partnership in the education of Providence's students.

Section 1:

PLANNING FOUNDATIONS

1.0 The Digital Age and the Changing Educational Environment

Access to and use of Information Technology, particularly in educational settings (K-12 as well as higher education), is a prerequisite to building the skills base that will allow our citizens to function productively in the information society of the next century.

—Executive Office of the President, 1998

Society is completing an evolutionary shift from the Industrial Age to the Digital Age. Accordingly, educational institutions must realign their practices, policies and procedures with Digital Age standards. Those that lag behind in strategic vision, realignment around technology, technology capacity, infrastructure, technology education, and establishment of support structures will be unable to fulfill their mission of preparing students for the future.

Technology has been a driver of change in such diverse areas as global communications, economics, the arts, politics, and environmental issues. While the world of business has readily adapted to and thrived upon technology innovation, the world of education has been relatively slow to reform.

Vision is needed to create new communication strategies, new paradigms for financing, new models for assessing success, and new models for educating. The Providence School District (PSD) has already begun much of this process including intense work on standards, infrastructure development, alliances with businesses and universities, and the recognition of the need for long range technology planning.

Our changing society and workplace require citizens who can take responsibility for their own learning and well being on a life-long basis. In addition we need these citizens to be able to work collaboratively, innovatively, and creatively. Educational reforms that help develop our citizens require a dramatic retooling of public education to leverage the power of technology in creating new and different learning environments. The time in PSD is here to think and plan strategically to further enhance comprehensive technology use in all facets of our operations.

The rate of knowledge generation and the corresponding demand for its use are rapidly increasing. We need citizens who can manage this vast increase in information. The life cycle of information continues to shrink. Much of what was learned a few years ago is no longer relevant.

It is projected that workers will typically change professions as many as five times during their working careers. Some estimates indicate that workers in the 21st century will require one year of formal instruction for every seven years of employment. Businesses have increased their technology education programs in response to employee needs for continuous professional growth. In addition, they expect all employees to be adept at using technology and information to support their roles. It is critical that PSD follow this example.

A primary motivation to move toward standards-based education has been the increasingly important need to assess a person's potential by the knowledge the student has gained and can apply in real situations rather than by the number of years of school the student has completed. New paradigms indicate a shift in educational requirements focusing on subject matter rather than seat time. This is reflected by the dramatic shift in global business toward outcomes, not process.

Restructuring for the infusion of technology within an educational environment requires simultaneous changes throughout the entire organization and community. Teaching methods have to be modified, curricula updated, parent-school relationships modified, and organizational structures changed to expand communication and collaboration options. New technology is of little value if teachers do not use it or do not have access to staff development aimed at building their proficiencies in this area. Classroom support for their efforts at integration is also critical.

The Digital Age is representative of a time where the volume of information is increasing exponentially while its life expectancy declines. Eight years ago, there were less than 50 viable sites on the World Wide Web. Today there are over 50 million. To operate successfully in the environment, schools must change their philosophy both about how they collect, manage, distribute, and control information; and about their role in society.

It is important for the future that schools produce critical thinkers capable of learning and navigating through vast amounts of available information. Many teachers use technology but do so merely as an extension of the existing learning model. The teacher must reconsider his/her role as the source of information and the student as the passive learner. Students must develop the skills necessary to become lifelong learners for individual success as well as for the economic stability and development of the community. This requires the interweaving of content objectives, process skills, and technology competencies at all levels of instruction as well as an extensive reformation in how we perceive teaching and learning. First and foremost, students must be able to access information, manipulate data, synthesize concepts, and creatively express ideas to others using video, text, and audio media. Technology can virtually bring the world to the child and provide teachers with a depth and richness of instructional approaches never before possible.

With the establishment of academic standards, technology can bring greater efficiency to both the instructional and administrative realms. This is especially important as teachers begin to use performance-based assessment to validate student learning and to maintain detailed records and learning profiles for all students.

In the future, the role of the teacher and administrator will expand into new frontiers. They will be mentors, architects, navigators, evaluators, synthesizers, analysts, and policy makers and assume any other role that will assure student success and overall district success. They will be the designers and visionaries who will make technology implementation in the classroom and district successful.

Administrative personnel must lead the way toward change. They must make clear strategic decisions and provide adequate support and technology education while creating technology-enriched learning environments in which people can do meaningful, quality work. They must, however, have access to decision support systems that can provide them with timely access to information that guides adaptations in the learning system for improved, better-targeted instruction.

2.0 Study Design

2.1 Purpose of the Planning Process

The Providence School District (PSD) is undergoing a major transformation to increase student achievement, create capacity for supporting and nurturing effective learning environments, and strengthening parent and public engagement. There are extraordinary challenges poised by the external environment that increase the demand for accountability. Further, a wide array of internal challenges must be addressed if the performance of the Providence School District is to improve. Among the internal challenges is the need to improve communications. Without an effective communications system, sharing of best practices, monitoring of progress indicators, and building support for improvement initiatives are extremely difficult.

Another major internal challenge is the equitable provision of quality educational resources critical to address the needs of the District's disadvantaged student population. Investment in the infrastructure for the delivery of instructional content as well as to support effective management at the classroom, school, and central levels is essential to the transformation.

Major objectives of the study are to:

- conduct a review of the existing technology resources and needs including:
 - assessment of current and projected technology applications
 - review of current and projected curriculum improvement activities
 - assessment of the technology support system resources
- identify strategies that support teaching and learning as well as opportunities for professional growth using technologies
- design strategies for improving the efficiency of instructional management, communications, and administrative functions through technology applications
- plan for the development of a district-wide information network system with integrated instructional and administrative information that builds effectively on the school district's current technology resources

2.2 Overview of Planning Methodology

Sound methodological approaches combine both qualitative and quantitative elements. By synthesizing the two, CELT conducted an assessment of the Technology needs in PSD schools that was comprehensive in both breadth and depth. The breadth was attained through quantitative measures designed to gain a generalized understanding of Technology in all PSD schools. A review of inventories, building wiring requirements, and results of recent infrastructure development efforts was undertaken. Depth was achieved through a variety of qualitative methods that included conducting focus groups sessions, interviewing key stakeholders, reviewing PSD documents, and performing site

visitations. These components served to provide a detailed view of the Technology needs related to the various school district functional areas. The combination of these methodologies provided a broad overview of Technology needs while offering an understanding of the diversity of individual voices within PSD.

The culmination of all needs analysis activities was the development of a comprehensive document, the *Technology Audit Report*. This report contains key findings, recommendations, and implementation approaches in major subproject areas that align with this Technology Plan.

3.0 Planning Foundations

A critical step in the planning process is the development of district-wide technology vision and goals to provide both a focus and a foundation for plan development. Technology should be clearly supportive of fundamental mission of the district. Recent strategic planning at the District-level resulted in establishment of District Mission Statement as offered below:

The mission of the Providence School Department, which serves a large, diverse, and rapidly changing urban community, is to inspire all students to become productive, self-sufficient citizens and to guarantee that all students will exceed national standards so that they can compete and contribute in a dynamic global society. We promise to provide a rigorous equitable and accessible education in a safe and nurturing environment."

A district strategic planning document, *Rekindling the Dream: A Framework for Reform in the Providence School District*, was also recently presented. The framework for this important document centers on achieving three primary goals:

- Increasing student achievement through a consistent and comprehensive focus on teaching and learning;
- Creating capacity within the system to support and nurture a continuous learning environment focusing on student achievement; and
- Strengthening parent and public engagement.

Support of these goals is paramount in the *Technology Plan*. The Action Plan (Implementation Resources, Section 3.0) illustrates linkages between major initiatives of this plan with the district goals listed above.

3.1 Technology Vision

The purpose of a Technology Vision is to provide readers with a view of how technologies will positively impact future learning environments, teaching, learning, and management. The vision statement is descriptive and provides a response to the question "What will it look like when we get there?"

"No other profession can say that they touch tomorrow everyday. Nobody has the opportunity to make a difference in the world every single day just by going to work. Nobody but a teacher can have a lifetime impact with a single statement."

—Melody Johnson, Superintendent

In response to mandates for improved teaching and learning and state education reform efforts in most major disciplines, the Providence School District have developed learning standards and assessments for various disciplines. Through these reforms, a need is expressed for Providence's students to:

- access, analyze, and communicate information
- think critically and creatively
- work cooperatively and productively with others.

The effective integration of technology into the Providence School District will both significantly increase student achievement and prepare students to enter and lead our technology-centered society.

It may be the first time in the nation's history that such ambitious goals can be achieved and in a relatively short period of time. The new technologies provide an amazing array of empowerment tools for schools, students, parents, businesses, and communities. Equipment is becoming faster and more powerful, capable of storing large volumes of information and educational materials. Access to vast resources of data, information, and visual material is commonplace and far less expensive than only a few years ago. Electronic linkages have become necessary, as in the business model, for effective communication among staff and parents, access to data for decision making, and for record keeping, scheduling, and connectivity with the community and other districts.

The **latest research findings** clearly indicate the power of new technologies to impact education. School improvement programs that infuse new technologies into instruction, assessment, and school management yield positive results. Findings include:

- Improves student performance
- Facilitates a broad range of learning situations
- Enables greater individualization of student learning
- Enables development and monitoring of individual learning plans
- Improves student motivation and retention
- Dramatically expands content for existing courses
- Directly connects students and teaching to current and relevant information
- Results in greater parental involvement (which increases student achievement)
- Improves the quality of student reading and writing
- Facilitates increased and improved professional development
- Facilitates better communication between a school staff and central office staff and between schools and the communities that support them.

By the year 2005, multi-media computers capable of delivering state-of-the-art educational support will be available in each classroom and library/ media center of the elementary and middle schools and in amply resourced specialized arenas for all high school students. Fundamental classroom needs for adequate power, wiring, and circuit protection will have been met. Classroom learning environments in Providence will change to accommodate new strategies for collaboration and investigation using emerging technologies. Teachers will have access and skills to use presentational software and projection equipment to support their teaching. Experiences with connectivity to vast external resources through reliable telecommunications systems will be provided to all students as part of their educational program.

All students will be trained on effective use of computers and other technologies in achieving and exceeding curriculum expectations according to an appropriate developmental timeline. Learning will become more engaging. Higher availability and access to PCs and powerful applications programs will allow students to become more proficient problem solvers in a number of subject areas. Availability of powerful technology both during the school day and into the evening for both students and other citizens will help establish a community of learners.

Students will acquire and use effective presentational skills for authentic audiences using various forms of multi-media and two-way inter-classroom and inter-school broadcasting. They will be more motivated learners, have higher self-esteem, and gain the skills and confidence required in the workplace.

Students will learn to work successfully both independently and in teams. Cooperative skill building will be enhanced through study groups and a variety of small and large group projects as technology enables immediate sharing and communication beyond the classroom and school building walls. Distance learning through networks and satellite transmissions will increase the scope and depth of numerous curriculum offerings.

Teachers will have additional flexibility, through technological support, for addressing multiple intelligences, multi-disciplinary approaches, and child-centered learning. Educators will have access to easy to use systems that accommodate curriculum mapping and that link learning standards and benchmarks to student information, learning resources, lesson plans, and assessment strategies. The individual needs within special populations (gifted, remedial, special education, bilingual, at-risk, etc.) will be addressed more readily through online applications that track achievement.

Teachers will be trained in expanded forms of performance-based assessments. This will enable them to evaluate students as a part of the instructional process, to electronically gather and store actual student work in video, audio, and text modes, and to readily share actual student work samples from teacher to teacher, grade to grade, and from school to home. A broad range of performance tasks, to include writing samples, projects, artistic creations, read-aloud samples, group reports, test data, and other information, will be stored electronically to assist in instructional programming and in parental communication.

Fax, voice-mail, and expanded telephone access will improve internal communications, reduce the need for meetings, and provide the time and opportunity for teachers to share successful practices and learn from each other. Exemplary lessons and instructional units will be made available online to support the exchange of ideas and teaching approaches.

Professional development for enhancing staff technology competencies will be ongoing, utilizing on-line resources, tutorials, and distance learning models. Student mastery of grade level technology competencies will be assured through a well-prepared teaching force. Teachers will work together on thematic and project-based learning, utilizing technology to identify and align resources that meet curriculum objectives. Technology will help teachers become facilitators of learning rather than presenters of information. Efforts will be supported by qualified technical staff to trouble-shoot and solve problems in a timely manner.

Administrative efficiency and communications will be enhanced through system wide e-mail systems, electronic bulletin boards, and distributed access to appropriate decision-making data and information. Electronic forms management and e-purchasing strategies will greatly reduce paperwork, increase efficiency, and achieve cost-effectiveness. Improved communications will reduce isolation among teachers and administrators and build unprecedented levels of sharing and understanding. Voice-mail, e-mail and telecommunications services, guided by standards for appropriate use, will greatly enhance teacher/ parent communications both generally and in regard to specific student issues and concerns. Students will have access beyond the school day to course expectations, assignments, and other resources. Using web-based approaches, school leadership will be able to readily inform and query the public on important issues.

Fulfillment of this Vision will help all Providence students to make full use of their learning potential, explore new frontiers, and contribute to society, and, through this preparedness, contribute to the future economic development of the city and region.

3.2 Strategic Design Decisions

Guiding Principles

The following are guiding principles and strategic-design decisions for the implementation of the Providence School District' *Technology Plan* 2002-2006. These were reviewed and approved by planning project participants.

- Technology systems and resources must have a significant positive impact on students in the classroom.
- Students must have equal access to technology and its benefits.
- Timely, extensive, high quality training for teachers, administrators, and other staff must accompany introduction of new technology.
- Implementation strategies will be highly flexible to meet the rapid rate of change in technology.

- The District will seek the most cost-effective ways to meet constantly changing conditions.
- Networks are the key to maximizing the potential of all technology components.
- Networked, readily accessible management information systems are necessary for efficient and effective management practices.
- Investments in technology must be sustainable.
- Technology staffing and funding at the district- and school-levels must be sufficient to ensure timely maintenance and effective use of resources.
- The proposed strategic design is guided by key operating assumptions and technology design decisions.

Operating Assumptions

The following are operating assumptions that will guide the development, implementation, and growth of the District's Technology systems:

- The integrated technology infrastructure will support decision-making, staff productivity, and the teaching/learning environment. Priority in the development and deployment of technology resources and initiatives will be given to the district's core business—teaching and learning.
- Information will be available when, where, and how it is needed to facilitate the generation of knowledge, good decision-making, and a fully informed public. Everyone in the District and in the total school community will have access to and be prepared to use information to support his or her learning and work.
- Performance measurement will be data driven, will focus on the achievements of all students, and will identify opportunities for continuous improvements.
- All teachers, administrators, and staff members in the district will be committed to learning how Technology can contribute to their ever-increasing productivity and to steadfastly incorporating technology appropriately into all aspects of their work.
- Technology will be viewed as a mission-driven line activity rather than as a technology-driven staff function. Funding decisions will be made on the basis of value, that is, the contribution of the technology to high-performance learning and informed decision making.
- Functions and operations must be redesigned before, or at least simultaneously with, the introduction of technology. Redesign should be undertaken by considering not only about how technology can automate that function or operation, but also by investigating how the function itself can be reconceptualized and redesigned because of the availability of technology.
- Parents and other community members will have an active role in planning and supporting the implementation of technology in schools.

- The district will monitor the effectiveness of technology integration and implementation and assess its impact on teaching, learning, and decision-making.

Technology Design Decisions

The following technology design decisions will guide the procurement and design of Technology systems within the District:

- The district-wide integrated technology infrastructure will support teaching, learning, and management.
- The design for the integrated technology infrastructure must encompass all PSD sites regardless of size or location.
- The integrated technology system will be accessible to teachers, staff, administrators, students, parents, and the community as established by District policy and the Providence One Plans. Nonetheless, it will be highly protected with security measures to prevent and detect unauthorized access to information.
- The integrated technology infrastructure design will be based on vendor-neutral, open standards to the extent feasible.
- The information system will be based on a distributed architecture, allowing applications on different computers and operating systems to exchange data.
- Security will be defined by roles, which will regulate access to data elements and functions performed.
- Preference will be given to application products that can be accessed by web browsers.
- The network will integrate voice, video, and data communications services, providing seamless communications within PSD and with the world.
- There will be well-designed standards for procurement, maintenance, and technical support as well as a uniform system for establishing, disseminating, and monitoring policies and procedures regarding technology.
- Standards for workstations and other technology components will be established and enforced.
- Database management software will be relational and accessible on a variety of operating systems and hardware platforms.
- A non-platform-specific data dictionary will be established that defines PSD data needed for operations and decision making at all levels.
- Information management will allow data to be entered, queried, analyzed, downloaded, and retrieved by authorized users.
- Wherever possible, information will be gathered where it is created, entered once and validated at the entry point, with the ability to identify who entered the data and who audited the information's accuracy.

- Customer support services will be expanded and strengthened to accommodate the expanded customer base accessing the system. Student technologists will be active participants in the installation, maintenance, and support of technology to the extent possible.
- Design and acquisition will consider not only purchase price, but also life-cycle costs associated with maintenance, support, training, supplies, and replacement.
- School district policy and plans will include provisions for keeping personnel and technology current.

Section 2:
TECHNOLOGY BLUEPRINT

1.0 Introduction

In recent years the term “technology” has been synonymous with “computers”. Today technology broadly connotes, multimedia, Intranet/Internet, e-mail, voice mail, wireless networks, digitized video, two-way video, and a wide variety of peripheral and portable devices. Advancing technology is creating an atmosphere requiring fresh visions to shift from Industrial Age instruction to Digital Age instruction. As the move toward standards-based education progresses, instructional environments will be increasingly learner-driven. To achieve a philosophical and instructional metamorphosis, technology must be an ongoing high priority, not as an end unto itself, but rather the means to enhanced teaching and learning. This technology plan should be considered a blueprint for change. With rapidly changing technologies, the district must adapt continuously and adopt the understanding that the only constant is, indeed, *change* itself. The planning process must be cohesive, dynamic and ongoing.

The Providence Schools *Technology Blueprint* includes rationales, major findings, major initiatives, and implementation approaches for the blueprint components listed below:

- Curriculum and Assessment
- Learning Technologies
- School Facilities and Learning Environments
- Communications and Network Infrastructure
- Administrative Computing and Decision Support
- Human Resource Management and Organizational Development
- Technology Standards, Policies, and Procurement
- District-, School-, and Program-level Planning
- Community Involvement

The *Current Status* subsections summarize key findings that resulted from the recent technology audit process. *Major Initiatives* were developed from a review by planning project participants of recommendations presented in the *Technology Audit Report* document.

The *Implementation Approaches* subsections are also derived from a review of audit results. The approaches and models presented are intended to help guide the plan implementation process rather than commit the District to any specific direction or set of activities.

In the next section of this plan, “Implementation Resources”, an Action Plan (3.0) further refines the action steps, timelines, and responsibilities for implementation for key initiatives provided in the Blueprint.

2.0 Curriculum and Assessment

"There is nothing or nobody – more powerful than the effects of a good teacher. There is nothing – not home environment, parental involvement, economic status – that a good teacher cannot overcome and intervene in the ability of students to succeed.

— Linda Darling-Hammond
Why Teaching Matters - 1997

The Curriculum and Assessment section addresses issues that comprise the core mission of the district, what we teach, how we teach, how we assess learning, and how we manage the instructional environment.

The topics presented in this section are:

- Student Technology Standards
- Curriculum and Technology Integration
- Assessment
- Curriculum Development and Learning Management

2.1 Rationale

The Providence School District (PSD) must augment and transform teaching and learning with technology to promote new teacher and student behaviors. New technology systems and tools can help teachers adapt even their current instructional materials and strategies to meet the learning standards of diverse groups of individuals and students. To improve learning in a measurable way, educators must identify the appropriate content standards, process skills, and technology competencies that their students need to acquire. Strategies regarding integration of these skill areas need to be developed and successful practices shared throughout the district. To enhance teacher performance, increase district-wide accountability, and make *every* child successful, the effective and timely management of large amounts of curricular and assessment information becomes pivotal. A curriculum development/learning management application can help educators make effective choices employing a web-based, relational database, decision-support system to link curriculum standards, student data, instructional resources, and assessment strategies.

2.2 Major Findings

Student Technology Standards

The district-wide student technology standards have not been articulated or embraced for grades K-12. Some Providence staff are knowledgeable about the International Society for Technology in Education (ISTE) National Education

Technology Standards (NETS) for students. Specific technology standards for students have yet to be identified and aligned with appropriate core curricular PSD areas.

Curriculum and Technology Integration

As stated in the framework for reforming Providence Schools, *Rekindling the Dream*, the District has made it a priority goal to improve students' literacy and numeracy competencies. All staff members are aware of the priority and are focused on meeting the goal. Special services and resources (professional development opportunities, mentor coaches, etc.) are being provided for the staff in meeting the improved literacy and numeracy goal. The ability and/or willingness of teachers to integrate technology into their daily curriculum activities vary widely from school to school, as well as among teachers within any specific school.

There does not appear to be a universally accepted strategy for promoting and supporting curriculum/ technology integration within and among schools.

Technology integration with the curriculum has been minimal due to:

- lack of internalized, adopted standard curriculum in all disciplines,
- low-access to current technology resources in the classroom, and
- lack of professional development targeted for technology skill acquisition.

Teachers and principals feel that there are a number of ways technology could be used to enhance and support their literacy efforts, but they are unsure what best practices are. The District will be using the framework of the "Principles of Learning" developed by the Institute for Learning at the University of Pittsburgh to transform the Providence School District into a standards-based system. There is no formal process within the District for selecting instructional software or other instructional technology resources to ensure alignment with District curriculum priorities. A few schools appear to be significantly more advanced than others in the area of curriculum and technology integration. Limited channels exist for teachers to share successful curriculum and technology integration practices with colleagues across the District.

PSD serve a significant number of bilingual students. Instructional technology resources are used minimally with this population to enhance their understanding of the English language.

Assessment

The components of the State Assessment Program are the following:

- *New Standards* English and Language Arts Reference Exam at grades 4, 8, and 10;
- *New Standards* Mathematics Reference Exam at grades 4, 8, and 10;
- *Rhode Island Writing Assessment* at grades 3, 7, 10, and 11 (pilot);

- *Rhode Island Health Education Assessment* at grades 5 and 9;
- *National Assessment of Educational Progress (NAEP)* at grades 4 and 8.

The results as to how the PSD is performing against the Rhode Island State standards for instruction are published annually by Rhode Island Department of Education.

In the recent past, a large proportion of the students in the elementary, middle and high schools in the areas of Mathematics, Reading and Writing had not met the state standards. The only exception is reading at the elementary school level whereby approximately half the students were able to meet the standards. The impact of technology integration has not been assessed with respect to improvements in student learning, grades K-12. Currently there is no data-driven approach to assessing and improving technology initiatives for teaching and learning.

Curriculum Development and Learning Management

Curriculum development and improvement has been largely driven by state assessment testing results. Improved performance on the Rhode Island State Assessments (RIEP) is one of the District's priority areas. Teachers commented on the significant focus and pressure to improve student achievement on these tests.

Teachers and administrators expressed the need for educators to be able to electronically track in an ongoing fashion what has been learned by individual students in order to guide instruction. It has further been expressed that older students should also have access to such information on their own progress. Administrators have expressed concern that they could not access state testing results (currently not electronically available) or other assessment information such as SATs, and Stanford SAT-9 test results through the district Student Information System REG 2000. PSD teachers have few resources to assist with the analysis and management of student information to inform decisions regarding curriculum and instruction.

2.3 Major Initiatives

Student Technology Standards

- Develop a set of K-12 student technology standards, differentiated by grade level.

Curriculum and Technology Integration

- Identify and adopt strategies, processes and structures for systematically integrating technology into the curriculum.
- Identify and expand successful curriculum/technology integration practices currently in Providence Schools.

- Develop communication channels, implementation strategies, and quality control procedures for documenting and sharing successful curriculum and technology integration practices among teachers.
- Employ technology enhanced strategies where appropriate to support instruction for the bilingual population and their families.

Assessment

- Implement a comprehensive assessment system that is easy-to-use, composed of multiple indicators, and provides teachers and administrators with information about student mastery of learning standards to enable more targeted instruction and facilitate compliance with ESEA.
- Adopt an evaluation framework for assessing the District's system-wide technology performance.

Curriculum Development and Learning Management

- Identify the critical components for a decision support system that includes a web-based curriculum development and learning management system to link curricular, instructional resource, assessment, and student information.
- Identify and implement strategies for providing teachers with current student information to help inform decision-making.

2.4 Implementation Approaches

Student Technology Standards

Two major educational movements have converged that are having a strong impact on approaches to teaching and decisions regarding resources. State and District officials have prescribed learning standards for major subject areas and



have aligned high-stakes testing to these standards. The second movement is the increasing use of technology to support content goals while providing students with the technology skills required for an information-based world of work.

New 21st century “common core” skills for all students reconsider the concept of learning being separated into specific discrete content areas (i.e., math, social studies, language arts) and embrace cross-cutting competencies that need to be incorporated within each discipline. See Figure 2-1 below.

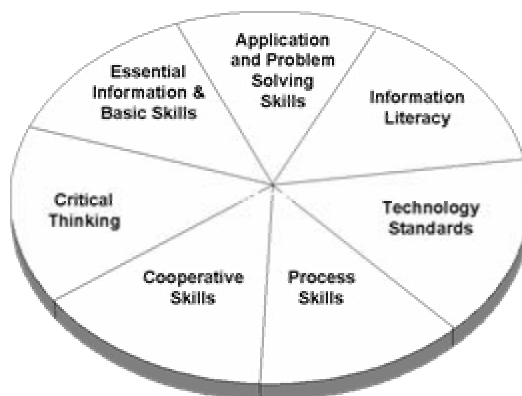
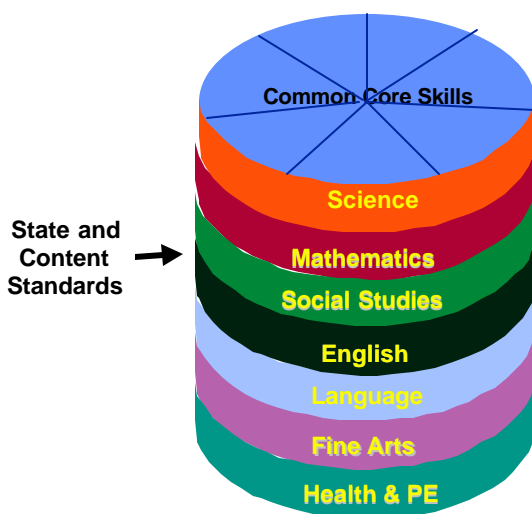


Figure 2-1: New Common Core Skills

In very real and distinct ways, technology can assist learners at various developmental stages. However, in order to take advantage of developmentally appropriate, technology-enriched lessons, a formalized approach for integrating technology into the curriculum should be undertaken. The District must first embrace a set of student technology standards. These standards serve as benchmarks in identifying the specific technology skills that PSD students must possess in order to acquire the new basic skills for the information age - the ability to access, analyze, and communicate information. Late in mid-November 1999, ISTE published and widely disseminated the *National Education Technology Standards (NETS), Connecting Curriculum and Technology*. A conceptual model to represent this idea of technology standards as a common core area enhancing, along with other common core skills, teaching and learning in all disciplines is shown below in Figure 2-2.



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Figure 2-2. Cross Cutting Core Skills

It is important to the District that the student technology standards be fully aligned and integrated with content standards in various disciplines and not be taught as a separate skill area or discipline. Strategies for integration should supersede efforts to teach technology standards in isolation.

The NETS Technology Foundation Standards for Students is available for review in Appendix A of this plan. These standards are divided into six broad categories:

- basic operations and concepts
- social, ethical , and human issues
- technology productivity tools
- technology communications tools
- technology research tools
- technology problem-solving and decision-making tools

PSD should consider the design and implementation of a web-based relational database to accommodate the K-12 aligned student technology skills that address specific content area standards. Details could be provided on what effective use of technology skills integrated with content standards looks like in the classroom. This database should be expanded over time and become highly accessible and searchable by teachers at all levels and in all disciplines as a reference for implementing the technology standards with academic learning standards. The District might consider the selection of core technology standards as a graduation requirement, once sufficient resources are in place to ensure equity of access for all students. For full accountability on this area, the District should establish appropriate benchmarks, performance measures, strategies for remediation, a central tracking system, and effective communication channels to achieve accountability in implementing the core technology standard requirements.

Curriculum and Technology Integration

Accountability for attaining student standards has the full attention of teachers and school leadership. Decisions regarding technology use have been strongly influenced accordingly. If technology solutions do not address learning goals and priorities, teachers will be reluctant to embrace their use. It is important then for Districts that want improved learning, understand the role of technology, and make decisions that clearly link hardware, software, and infrastructure use to meet established learning goals. Teachers commonly report that identifying software that meets their curriculum needs is difficult. Locating Internet resources that are appropriate in addressing standards can also be tedious and time consuming without appropriate search strategies.

Accordingly, PSD should select and endorse a set of research-based curriculum/technology integration approaches that align student technology standards with content standards and process skills, such as those identified by the ISTE 1999 publication *National Educational Technology Standards for Students ~ Connecting Curriculum and Technology*.

Efforts must be made to focus major curriculum and technology integration initiatives on specifically identified District priorities such as:

- bilingual education
- reading and writing skill improvement
- math skills and understanding
- students at-risk

PSD should consider developing a District-wide online system that aligns an array of educational materials, technological or otherwise, with state learning standards, and with PSD' goals and major educational priorities.

Whenever a major curriculum program or initiative is brought into the District, full consideration must be made as to effective strategies for:

- integrating student technology standards effectively with the content standards and process skills that constitute the initiative,
- using technology effectively in the delivery, administration, and support of the program or initiative,
- building the use of technology as an integral part of the staff development for program implementation.

Curriculum and technology integration can best be described as the alignment of PSD content standards with the cross-cutting competencies in technology and problem solving so that students and teachers learn about technology by teaching and learning with technology. Core technology standards provide the direction for infusing technology tools and resources into appropriate curriculum areas. An Integrated Unit Plan (IUP) model can assist PSD teachers with the curriculum/technology integration process by ensuring equity and access to fundamental technology competence. This conceptual model is depicted in Figure 2-3.

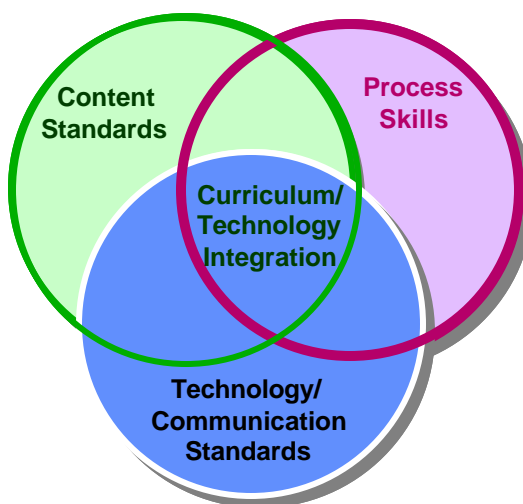


Figure 2-3: Curriculum/Technology Integration Approach

An IUP targets PSD' content standards, student technology competencies, and other appropriate cross-cutting competencies simultaneously within specific subject areas.

Westward Ho!, a sample IUP presented in Appendix B, uses the study of westward expansion as a framework for addressing social studies standards, research skills, and also writing and communications skills for grades 4 or 5.

Individual integrated unit plans can serve as maps for the development of curriculum packages that guide daily instruction in PSD schools. Development of IUPs can be a major staff development activity for improving teacher capacity in curriculum/ technology integration. Teachers not directly engaged in developing IUPs can nonetheless benefit greatly from reviewing and adopting IUPs that have been approved. A resource bank of approved IUPs can become a very valuable resource for integration models. The models can be searchable by grade level, discipline, learning standard, technology competency, or even key words.

Over time, the successful alignment of curriculum and technology through the use of such models as the integrated unit plan brings about observable changes in teaching and learning environments.

Assessment

There is a need for a systemic, technology-supported approach to student assessment and evaluation.

In light of assessment requirements of the "No Child Left Behind" Act, districts soon must track and compile student assessment data in reading and mathematics on an annual basis. Hopefully, such an assessment approach will provide teachers with timely and ready access to assessment information on individual students to the extent that such data can be used in the immediate design and adaptation of instructional activities.

PSD should strive to implement a District-wide student assessment system that:

- addresses multiple indicators (i.e., the SAT-9, RIEP, and authentic classroom-embedded assessment measures);
- correlates all forms of student assessment with the content standards, benchmarks, and performance standards;
- links directly to curriculum development and learning management information;
- provides electronic, easy-to-access information;
- creates assessments that determine student proficiency with technology in the context of the integrated curriculum;
- includes ability to aggregate and disaggregate assessment data by multiple student characteristics;

- provides on-line assessments that are timely and easily implemented in critical development areas and levels;
- meets the needs of all students.

Technology can enhance the success of all PSD programs and play an instrumental role in meeting their goals. It can support important activities, such as implementing a program's evaluation and student monitoring system. A critical area of need for technology integration in programs is in the support of product indicators including tracking at-risk variables, student achievement, discipline records, attendance rate, and graduation rates for students' participation in specific PSD programs. Technology can also provide timely information regarding the numbers and types of students involved in a program's learning experiences, as well as teachers trained in different aspects of a program's support system.

As part of the decision support system building process, the major critical information needs for staff in various PSD programs should be identified and prioritized. Identification and selection of a set of data for use by staff should occur, but this must be accomplished within the framework of a comprehensive student database. To ensure success, program staff must also have easy and daily access to hardware, software, technical training, and support. The data set should be carefully selected to align with the requirements of the "No Child Left Behind" Act. Implementation, monitoring and evaluation systems should be established to ensure quality, coordination, and goal achievement. Throughout any program implementation process, action steps should have clear linkages to the strategic goals presented in *Rekindling the Dream* (1999) and the *Technology Plan*.

It is proposed that PSD research and disseminate, via the PSD website, successful strategies, programs, and models for addressing the needs of students at-risk from preK through grade 12 by:

- defining and identifying the District's at-risk populations by reviewing data on schools that fail to demonstrate adequate yearly progress (AYP).
- determining criteria for selecting at-risk populations that can benefit from technology enhanced interventions
- aligning technology enhanced interventions with at-risk populations
- creating and disseminating assessment strategies to align individual students at-risk with the most appropriate interventions.

In addressing other at-risk factors, the District could increase access to PSD instructional technology resources by promoting partnerships with childcare service providers offering before-school, after-school, week-end and summer programming for PSD students.

Curriculum Development/Learning Management

Curriculum development/learning management (CDLM) software systems that link curriculum with student information, instructional resources, and assessment strategies, can facilitate the orderly flow of large quantities of integrated information that has an impact on teaching, learning, educational management, and decision making at all levels. PSD educators can use a CDLM application as part of a district Decision Support System (DSS) to articulate and catalog learning goals (e.g., content and performance standards and benchmarks, etc.) and cross-cutting competencies as they relate to selected curricula. Once standards, benchmarks, and competencies have been electronically catalogued, a CDLM approach would allow for the detailing of learning resources as they support teaching processes, and of strategies that will lead to student achievement of each benchmark.

As illustrated in Figure 2-4, multimedia, software, books, manipulatives, etc., can be correlated to specific learning goals with a comprehensive description as to the use of such materials. Teachers can document, record, and electronically share units and lessons that have been successful in achieving desired student performances. The correlation of performance to instructional resources will shift the emphasis away from a curriculum dictated by the textbook to one encouraging inquiry and the development of lifelong learning skills (constructivism). The textbook now becomes only one of many resources available to assist PSD teachers in reaching the student educational goals reflected in the CDLM approach.

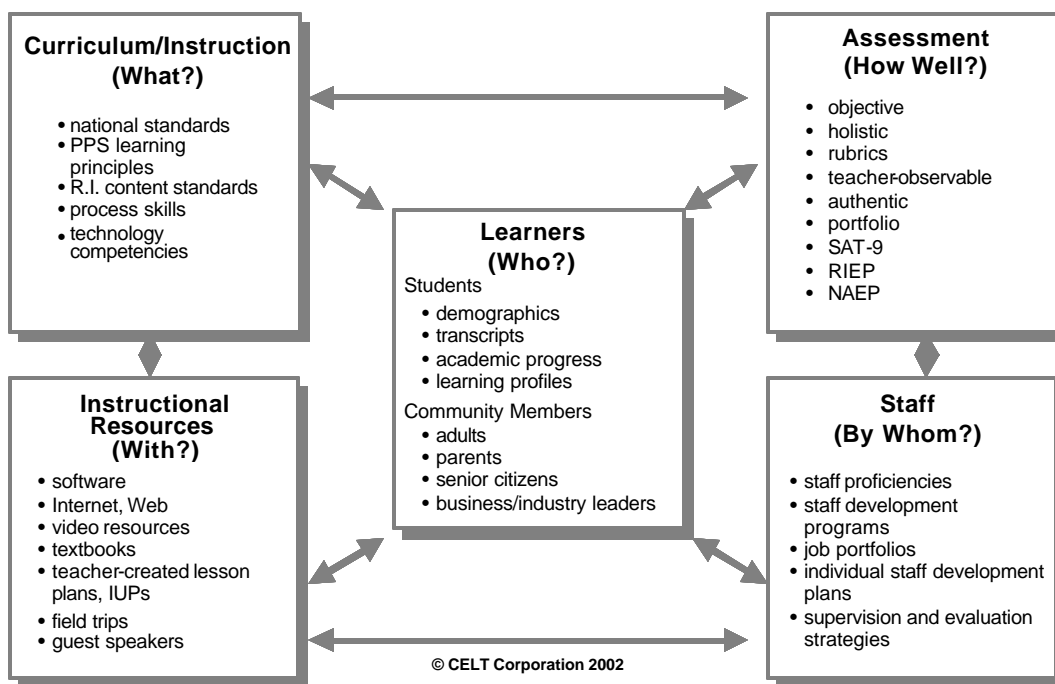


Figure 2-4: Technology in Support of Curriculum Development/Learning Management

With CDLM technology in place, student assessment can be correlated to performance measures. CDLM software can record the PSD's multiple assessment indicators and link them to the Rhode Island Curriculum Framework standards and benchmarks (i.e., Rhode Island State Assessment [RIEP] in Language Arts and Mathematics, National Assessment of Educational Progress [NAEP], Rhode Island Writing Assessment). A CDLM system will also enable educators to create banks of test items and catalog other evaluation methodologies (e.g., holistic scoring, teacher observable assessment, portfolio/authentic assessment, etc.) against desired student performances. Assessment reports generated by CDLM software are varied, offering detailed information to parents, teachers, and students, and can assist the District in establishing District-wide report card standards while offering local districts and schools the flexibility to customize certain reporting components.

Using CDLM technology, educators and parents will be provided with comprehensive profiles of student performance against designated performances for the duration of a student's enrollment in the District. A rich variety of information made available to teachers, administrators, and parents through CDLM will enable them to determine which learning methods, resources, and student assessment measures are contributing most to student attainment of State content standards and benchmarks.

PSD should consider development of a decision support system to meet a variety of administrative and instructional needs. Strategies may be identified for providing teachers with current student information to help inform timely decision-making. Reports and queries may be developed that integrate with the District's REG 2000 Student Information System to provide teachers with a timely analysis of useful current information to help guide instruction.

The District should integrate into the proposed decision support system a curriculum development and learning management component that will:

- be easily accessible to teachers and administrators at the classroom, school, local district, and District levels
- use a relational database architecture
- link curricular information (e.g., content standards, performance standards, etc.) with learning resources, student assessment, and student information
- monitor the alignment of instructional resources to District standards
- enable educators to record and share the alignment of content standards, benchmarks, performance standards, frameworks, and cross discipline competencies

Steps for acquiring and implementing a curriculum development/ learning management system would include:

- clearly defining for administrators and educators the intent and purpose of the system for improving instruction.

- developing functional and bid specifications for a CDLM component in accordance with identified District needs and with full compatibility with other applications (REG 2000, human resources, etc.) in the decision support system
- procuring, implementing, and testing the curriculum development/learning management system in a pilot setting.
- implementing the curriculum development/ learning management system across the District
- providing training and support for maximum utilization of the CDLM system.

Curriculum and technology will play an unquestionably crucial role in the futures of PSD children. Experts from many disciplines echo the sentiments that technology should and can play an important role in curriculum planning, development, delivery, assessment, and administration in fostering student academic excellence.

3.0 Learning Technologies

Nobody would ever think to share a single textbook among 30 students, and we still have classrooms where we are lucky if there's more than a single computer in the classroom.

—Linda G. Roberts, Former Director of Technology
U.S. Department of Education

Selecting realistic and appropriate technology learning environments designed for the primary to adult learner to address district-learning needs and priorities is of critical importance to Providence Schools

The topics addressed within this section are:

- Technology Utilization
- Access and Equity
- Instructional Applications
- Internet Access

3.1 Rationale

Curriculum decisions should be the driving force behind the selection and purchase of hardware, software, and network solutions. Schools embracing this strategy in technology planning will develop a unique, meaningful, and shared vision and a pathway to achieve desired results. There are many technologies that have the potential to facilitate learning. Likewise, there are many ways of organizing technologies and many approaches for using technology at different school levels (primary, elementary, middle and high school). This Plan proposes strategies to effectively align curriculum with technology enhanced learning environments and seeks to attain equity of technology resources throughout the district.

3.2 Major Findings

Technology Utilization

The type and quantity of technology in classrooms varies greatly between schools. Often newer schools are more technology-rich than the older schools, or it varies by the priorities of the school building administration. During site visits a large variance of technology resources was observed. Other than State- and District-wide initiatives in support of moving computers into classrooms, schools have few models to guide the distribution of technology resources.

Some schools are having success in using individual laptops and mobile laptop computer carts. Although all schools have at least one data projector, more teachers would use them if more were readily available. TV monitors are available in some classrooms.

Access and Equity

The school communities of some sites are more proactive in their support of instructional technology than other sites. Decisions about technology acquisition are largely the responsibility of building principals. Many have not made instructional technology a priority for funding from the regular school budget.

Recently, the Chief Technology Officer has centralized much of the technology purchasing and is assuming many of the distribution responsibilities. The degree to which schools have and will be able to achieve the student technology standards is directly impacted by the technology resources available in their building. Many Providence elementary schools are open beyond the school day to provide continued care and extra curricular activities. Some of these programs are using technology resources to engage and motivate students. No district-wide program exists for the loaning of computer and other technologies to students and staff.

Instructional Applications

There is wide variation in the instructional applications used in Providence schools. There is also considerable variation in the degree of use of instructional applications across schools. Students in the schools with the greatest technology integration are designing websites, publishing school newsletters, creating books, all with a wide variety of instructional applications.

Internet Access

Instructional staff and a small number of students have e-mail on the Providence School District systems. In a vast majority of the schools teachers and students do not use the Internet to communicate with each other. The Chief Technology Officer is in the process of centralizing all inter-school access as well as the Internet Access

3.3 Major Initiatives

Technology Utilization

- Develop strategies to integrate technology into the K-12 curriculum areas that include descriptions of appropriate technology enriched learning environments for various grade levels and subject areas.

- Acquire and implement low-cost alternatives to desktop computing devices and resources that have proven successful in supporting curricular goals, improving literacy, and increasing student achievement on state assessments.

Access and Equity

- Acquire instructional computers to attain a student-to-computer ratio of 5:1 with peripherals in accordance with a procurement and allocation schedule that addresses equity of access issues district-wide.
- Identify and promote a variety of technology supported solutions and strategies for students at-risk which provide interventions during and beyond the standard school day.
- Develop and implement strategies for providing student, family, and teacher access to technology during after school hours.
- Provide one multimedia computer to each teacher, or team of teachers, with readily accessible projection capability via data projector or large monitors in classrooms.

Instructional Applications

- At the District level, standardize on a core set of applications beyond the productivity suite that the District is able to support with professional development offerings and on-going integration/ implementation assistance.

Internet Access

- Complete WAN installation across the district and increase bandwidth to schools to support high-speed Internet access.
- Expand the use of e-mail to all staff and students who could benefit from it educationally.

3.4 Implementation Approaches

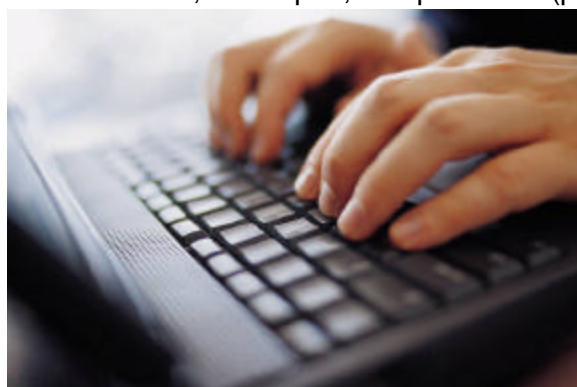
Technology Utilization

Once an accessible high speed and reliable WAN is established, design a website to distribute the technology utilization strategies to teachers that include: software selection guidelines, successful integration strategies, technology supported programs and models for addressing the needs of students at-risk from pre-K through grade 12. Software selection guidelines, designed to assist

teachers in the selection of technology-based resources that are differentiated by instructional levels and content area will need to be reviewed and updated regularly. Staff development that is linked to selection guidelines, should be designed and offered.

Initially, all schools should be provided with the ISTE guide *National Educational Technology Standards for Students ~ Connecting Curriculum and Technology* and give teachers access to its contents. The District needs to identify, embrace, and disseminate this collection of research-based curriculum/technology integration approaches that align student technology standards with content standards, and process skills.

A guide for creating effective technology enhanced learning environments should be researched, developed, and published (print and electronic) that includes the



use of alternative desktop computing devices, such as portable writing keyboards, graphing calculators, laptop and portable computers. Portable keyboards (i.e., AlphaSmart, DreamWriter) have much promise for addressing literacy skills at low cost. The District could identify mentor teachers who have used these devices and are willing to work with others facilitate effective

integration into classroom activities. This mentoring could even be provided remotely via e-mail.

The District should negotiate volume-purchase agreements for all Providence schools with vendors of these alternative desktop computing devices. The Central Office should distribute procedures for securing devices at these prices to all schools. Further, the District should maintain up-to-date hot links to vendor sites and school sites describing successful implementation strategies/processes via the District website.

Access and Equity

Acquisition and management of technology resources address both access and equity issues. Access refers to the students' ability to use instructional technologies to enhance/support learning about and with technology. Access is linked to several important variables:

- the number of computers (generally evaluated in terms of a student-to-computer ratio)
- the location, configuration, and scheduling of technology resources
- the use of networking and/or telecommunications to transcend classroom and school geographical boundaries

- the proficiency of teachers and administrators who can support and guide instruction

Acquisition deals with the funding approaches and decision-making processes by which schools acquire instructional technology resources.

The efficient acquisition and management of technology resources will help ensure that:

- schools are provided with equipment that meets or exceeds district standards
- all students have access to current, appropriate, and sufficient information resources
- existing resources are used to their maximum potential so that future dollars are spent in areas of greatest need
- all schools attain a sufficient infusion of instructional technologies to attain district goals through local implementation solutions

PSD needs to define and adopt “critical mass” configurations for classrooms and learning environments at all levels. (Critical mass is defined as that level of technology infusion sufficient for measurable gains in student performance.) Many schools may wish to shift existing computers from labs to classrooms when space considerations and resources allow, preserving labs when appropriate to learning needs.

Existing technology should be replaced or upgraded when it no longer enhances the teaching and learning processes in classrooms or labs. The deployment of assistive/adaptive devices for special needs populations must be included based on the populations serviced by the school.

PSD should research and disseminate via the district website successful strategies, programs, and models for addressing the needs of students at-risk from pre-K through grade 12 by:

- determining criteria for selecting at-risk populations that can benefit from technology enhanced interventions;
- aligning technology enhanced interventions, including hardware and software models, with at-risk populations;
- creating and disseminating assessment strategies to align individual students at-risk with the most appropriate interventions.

For instructional applications, classroom management, effective communications, and personal productivity all teachers need easy access to computer workstations. Therefore, Providence should provide one multimedia computer to each teacher, or team of teachers, with readily accessible projection capability via data projector or large monitors in classrooms. Projection devices should be minimally available for use in computer lab settings. Security of these computing resources will be critical. Providence should involve tech teams in the establishment of firm physical security and user policies to protect the projection equipment and other portable peripheral devices.

Instructional Applications

There is great variance in software used across the district. At the District level, Providence should standardize on a core of applications beyond the productivity suite that can be supported with professional development offerings and on-going integration/ implementation assistance. Standard applications should include age appropriate website design, multimedia presentation, desktop publishing, and thought generation/brainstorming applications.

Teams of teachers and curriculum leaders with experience in technology integration should identify and select developmentally appropriate applications for grades preK-12 that align with District curriculum guides while supporting and enhancing the current productivity suite. Providence should coordinate vendor demonstrations of instructional technology applications at convenient sites throughout the District.

Featured software applications should be demonstrated to a wide audience of Providence teachers. The Central Office should develop dissemination strategies for making teachers aware of these resources and their intended use. Also, the District should ensure that high volume purchasing agreements or licenses for these core applications are negotiated annually, as needed.

Internet Access

The power and potential of the World Wide Web and its vast collection of educational resources is largely untapped by Providence schools. Limited telecommunication capacity and Internet connectivity prohibit many teachers and students from benefiting from this global network of information.

PSD should identify strategies that take advantage of the Internet access throughout the district as robust school and classroom connections increase. These strategies include:

- providing professional development and technology resources to enable faculty opportunities for experimentation with and exploration of the Internet,
- determining appropriate instructional resources that can be made available for after-hours student access and for community access via the Internet, and
- developing web-based strategies for community information access and dissemination.

The District can also address the need for expanded home/school communication linkages to families and community centers using the Internet to inform community members about the availability of resources, services, and student support strategies.

For these implementation approaches to be effective overtime, PSD will need to maintain and improve existing district and school web sites, monitor use levels and access, and plan for expansion as demand/usage increases.

Communications district-wide can be enhanced greatly through the effective use of e-mail. Providence should expand the use of e-mail to all staff and students who could benefit from it educationally. To support broad e-mail use, Providence should continue with the efforts to expand bandwidth to schools to enable increased e-mail traffic at higher speed. Providence should:

- Standardize e-mail applications for school staff.
- Provide additional training regarding e-mail use to school-level support staff.
- Use e-mail within a school building to relate information and policy.
- Use e-mail as vehicle to communicate between Central Administration and the District's 51 schools.

4.0 School Facilities and Learning Environments

People tend to overestimate the impact of new technologies in the short run, and underestimate their long-term impacts.

—Mary O'Hara Deveraux, Institute for the Future

Curriculum decisions should be the driving force behind the selection and purchase of hardware, software, and network solutions.

The topics addressed within this section are:

- Facilities Issues
- Building Wiring
- Technology Enriched Learning Environments
- Libraries/Information Resource Centers

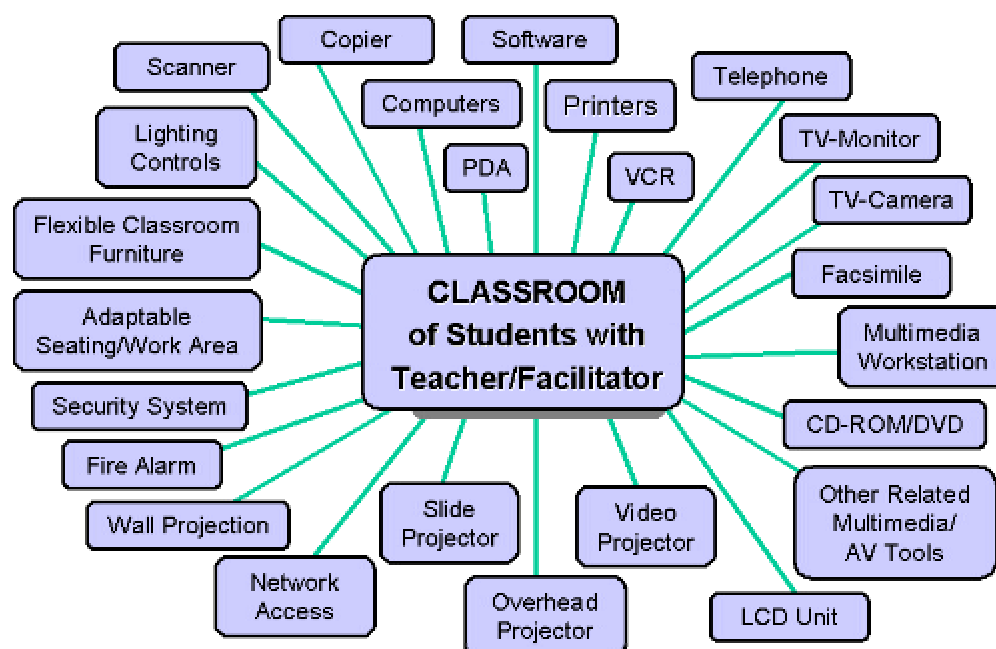
4.1 Rationale

Technology can be the key to knowledge, a window to the world, the path to explore any subject, anywhere, anytime, a beacon toward the future. Providence School District's vision for technology is not merely the installation of computers, televisions, phones, video equipment and the like, but the capability to deliver a future to its children.

Pedagogically sound rationale should be the foundation of curriculum decisions to:

- provide equal access to information and resources for all students
- acknowledge developmental needs of the learner population
- incorporate diverse teaching and learning strategies to address unique needs of all learners
- promote relevancy by addressing real-world situations and solutions
- advance higher-order and cooperative learning skills
- develop a desire for lifelong learning and responsible societal membership

Schools that embrace these goals in technology planning will develop a unique, meaningful, and shared vision, and a pathway to achieve desired results. There are numerous technologies that have the potential to facilitate learning (see Figure 4-1). However, there are many ways of organizing the technologies and various approaches for using the technology at different school levels (primary, elementary, middle, and high school). This technology plan proposes strategies to align curriculum effectively with technology-enhanced learning environments and seeks to attain equity of technology resources throughout the district.



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Figure 4-1: Technology-Supported Classroom

Selecting realistic and appropriate technology learning environments designed for the primary-to-adult learner to address district-learning needs and priorities is of critical importance to Providence School District.

4.2 Major Findings

Facilities Issues

Local Area Network (LAN) components are often placed in inadequate, insecure, poorly ventilated areas and the network thus far has failed to meet minimum requirements access for all the schools. Video screens in classrooms are not available or large enough for adequate viewing of computer information. Students are not always able to read the text being discussed during a presentation.

Building Wiring

The district has set a goal of having four computers connected to the LAN in every classroom. In order to meet their goal, PSD has filed for and received E-rate funding since the program's inception. During the first year, E-rate funded \$4 million to begin the construction of the data infrastructure. At the end of the second year all but four schools were wired with four drops in every classroom.

Some Main Distribution Frame/ Independent Distribution Frame (MDF/IDF) equipment lack adequate space. The MDF/IDF areas need to have dedicated space for ventilation, future expansion, and worker access. In many of the schools the spaces being used for placing MDF/IDF equipment do not meet the environmental needs of the equipment.

Technology Enriched Learning Environments

Technology resources in Providence School District vary by school. There is no typical configuration in the elementary schools. Some use computer labs while others place computers in classrooms. Some have state-of-the-art wireless labs for classrooms, while others use antiquated equipment. In some classrooms there is a dedicated teacher workstation while in other classrooms teachers do not have easy access. Some building networks are used to support the teaching of research skills through the use of the Internet.

Policies or procedures for deciding where to place or move technology within a building do not exist. Teachers are seldom consulted before computer technologies are purchased and arranged in a building. Technology components are sometimes moved within a building without proper handling. There is a shortage of assistive technology equipment to meet the needs of special education students. The District recently received a \$100,000 grant to update special education classrooms.

Libraries/Information Resource Centers

There is inequity across the schools regarding equipment and resources in the school libraries. Technical skills vary widely among the library/media specialists. Library/media specialists feel they do not have a specific advocate within central administration. Although many library/media specialists believe that part of their role should be to assist teachers in doing lesson plans and finding resources (on line and within collections), there is no time available for them to give teachers that support.

There are no implementation strategies for professional development for library/media specialists, who believe specific technology training should focus on the library as a delivery system of academic resources. When the Wide Area Network is in place, delivery of resources, such as automated catalog system, reference materials, etc. should be District-wide.

Many libraries have equipment that is in disrepair and non-functioning. If the library/media specialist does not have the required skills to repair the equipment, it takes an inordinate period of time to get the equipment in working order. The library/media staff has little time to collaborate with classroom teachers to help align resources with instruction since many are used regularly as substitutes and technical support resource staff.

4.3 Major Initiatives

Facilities Issues

- Connect all classrooms and computers to the PSD networks.
- Examine all instructional areas in light of the need for viewing computer information, and develop a solution for typical instructional scenarios.

Building Wiring

- Allocate a permanent, dedicated location at each school from which all cabling operations and network operations can occur, following IEEE specifications.

Technology Enriched Learning Environments

- Develop a consistent standard for the amount and type of technology in the typical classroom at each grade level and/or discipline.

Libraries/Information Resource Centers

- Implement a phased approach focused on transforming school libraries into information resource centers.

4.4 Implementation Approaches

Facilities Issues

Although many schools have Local Area Networks (LANs) that have computers attached. The benefits of networking computers, both instructional and administrative, need to be fully realized. The district must ensure that computers are on school-wide LANs in the near future. New and existing facilities installation and upgrades need to be in accordance with the E-rate specifications to maximize the use of federal funds.

A district standard regarding the availability and use of interactive video technology needs to be established for distance learning. All parts of school buildings, including new additions, should be wired for such access. Amplifiers may need to be installed in identified areas to keep the signal strong throughout buildings.

PSD should conduct a study of all instructional areas in light of the need for viewing computer information and determine the best method to meet the full class display requirements in the classroom or other learning environment. For example, a gym could include a very large projection system. A special education classroom could simply have the presenter's data screen shared to the viewer's data screens. Based on the study, the district needs to develop a set of instructional display standards based on the functional needs of classrooms and other instructional areas. These standards should encompass large screens,

projectors, LCD projectors, and shared data screens. Once the standards have been established, the district should install the appropriate audiovisual projection system in every instructional space.

The district must ensure that all planning arising out of any facilities upgrade initiative clearly encompasses approved recommendations contained in this plan. Adequate power, space, and HVAC must be planned for in order to accomplish the desired technology infusion into classrooms and office spaces.

Building Wiring

The status of the classroom data wiring will need to be reviewed and the network capabilities upgraded in order to achieve the recommended access speed and to accommodate the communications needs of the school. Any wiring that does not meet the standards defined will need to be corrected. The schools will need to verify that they are wired to accommodate voice, video, and data (VVD) with Category 5e copper UTP, fiber optics, and/or coaxial cable consistently throughout the district. All data circuits will be tested and corrected if necessary for operation at 100 MHz using procedures defined in EIA/TIA 568A specifications. Additional cables and jacks will be installed so that a data port is located within six feet of every workstation. All horizontal communications cabling will avoid parallel runs with power circuits and will not cross lighting enclosures. Branch circuits serving workstations and communications systems will not serve other electrical machinery.

A site-analysis needs to be conducted in each school to identify a permanent, dedicated location for an MDF Communications Closet in the building that can meet the facilities' needs for all networking services. The location will require the availability of clean electrical power and proper ventilation, and must be accessible for support personnel, following IEEE specifications. There need to be designs for the IDF Communications Closets with appropriate ventilation according to the square feet specifications of IEEE to ensure space for the switches, multiplexes, etc., as well as space allotted for future expansion. Using E-rate funds, the distribution racks and communications equipment in MDF and IDF closets need to be installed with enough space around the equipment for repair and servicing according to IEEE.

Technology Enriched Learning Environments

The technology enhanced learning environments will be designed to support a range of instructional activities appropriate to the developmental needs of the learners, staff competencies, education reform initiatives, and specific technology applications. The effective integration of technology resources into individual classrooms across the city of Providence will occur more as an evolution, rather than an event. The infusion of instructional technologies into facets of daily practice will occur slowly over time as paradigms regarding teaching, learning, and the role of technology shift. The type and availability of computing resources will affect the speed and degree of change within individual teachers, classrooms, schools, and the district as a whole.

Figure 4-2 diagrams technology-enhanced learning environments, having as its hub the library/media center.

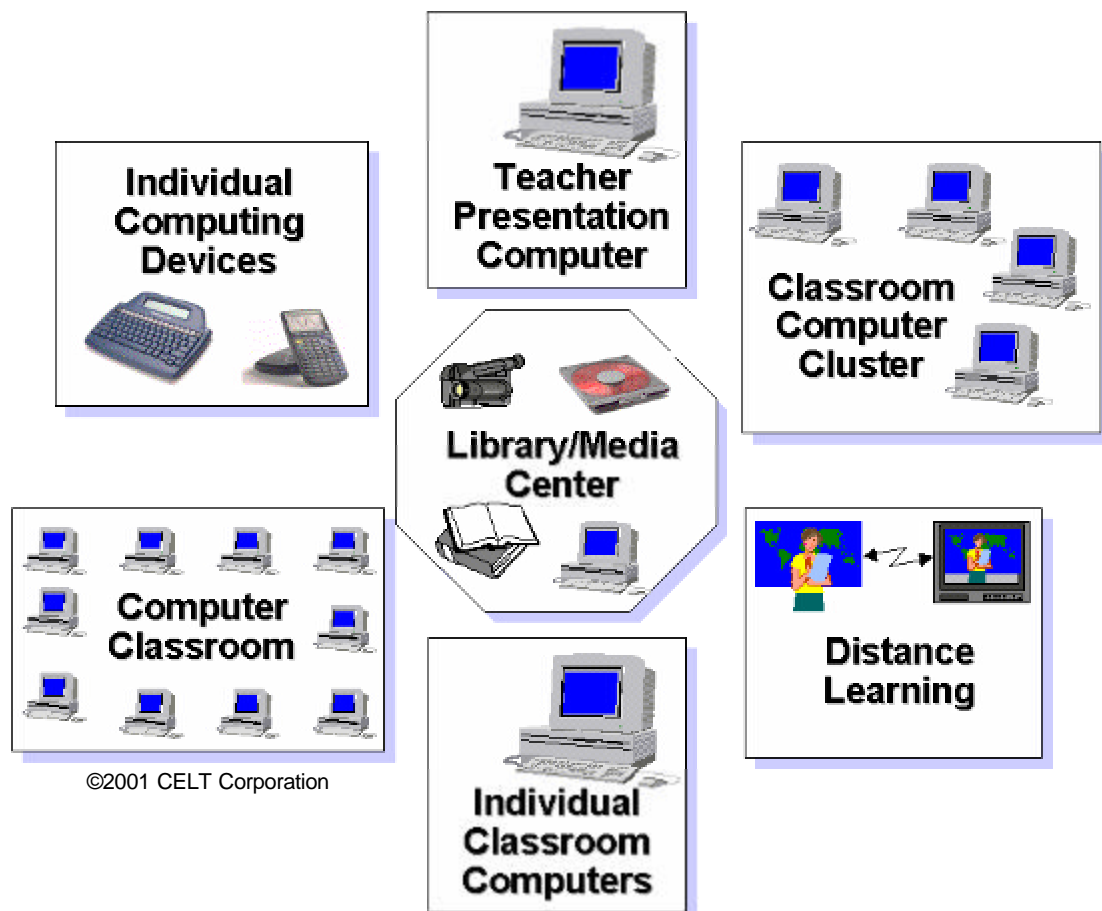


Figure 4-2: Technology Learning Environment Models

The basic computer unit serves as the foundation for building the various models by incorporating specific software and peripheral components, each designed to provide unique functionality. The task of educators is to link this functionality effectively with curriculum, and instructional management needs and outcomes. Software selection and other factors will define the capacity of the system required in terms of memory, hard drive, and system speed for acceptable performance levels; this will vary over time.

Classroom Equipment: The goal is for each classroom to have the following equipment:

- teacher workstation in every classroom
- two-to-five student workstations in each classroom
- networked color printer
- scanner and digital camera available

- telephone, with a “do not disturb” option so that no interruptions occur during class
- voice mail on telephone

Specialty Areas:

- one or more computer labs with about thirty computers
- library/media center with fifteen-to-thirty computers

Administrative Areas:

- workstations
- telephones
- voice mail on telephone

School Services: To support the other services, several school level systems must be in place. These include:

- telephone PBX system with voice mail
- network servers (web, fileserver)
- Ethernet switches (10/100) to interconnect workstations, servers, and the Internet
- router that connects the school to the district network, enabling access to the Internet and district applications at 1.5 mbps (T1)
- uninterruptible power supply (UPS)

All systems require installation, configuration/set-up, and testing prior to acceptance.

The district needs to review the status and the location of computer equipment at each grade level, based on the instructional needs identified by teachers at those grade levels. All schools will need to be visited and surveyed to assess the location, type, quantity, and quality of all technology resources in the buildings. Design templates need to be developed for creating technology-learning environments that support the variety of learning/teaching needs at the elementary, middle and high schools in classrooms and large instructional spaces, labs and special education environments. The recommended standards and designs need to be implemented with a policy that equitably and adequately distributes instructional technology resources throughout the district.

Currently the district has workstations running MAC OS, Windows 95, Windows 98, Windows 98 SE, Windows NT, and Windows 2000. This reflects three distinct code bases for the operating systems. Many of the older educational applications will not run on Windows NT or Windows 2000. Windows XP is more stable, secure, and manageable than the Windows 9X series operating systems. Moving to a common network operating system will reduce support cost and improve stability. PSD needs to continue the use of building networks for access to the Internet and for teaching research skills.

When the District purchases workstations and servers, it should also purchase pre-installed, commonly used software. This will eliminate the need for district personnel to install the software upon delivery. Pre-installation of software is potentially the lowest cost approach to software purchases. It also allows the purchases to be funded from operating or capital funds.

The remote management and installation of software will allow ongoing inventory and management of all workstations and servers. It will allow new versions of the operating systems and applications to be installed overnight remotely. It can assist the district in detecting unlicensed software. The remote-installation software could either be the type that installs software on individual workstations or the type that can also remotely refresh the workstation image should the computer become corrupt due to hardware, software, or user error.

The district needs to be sure it implements a long-range plan to retrofit old buildings to accommodate technology and must follow the per-pupil space needs using the educational specifications developed in 1999. The district should also consider using compact/portable technology devices for teaching and learning wherever possible in order to maximize the impact of technology in limited classroom space.

Network security in a preK-12 environment that is connected to the Internet is more complex than in many other types of organizations. Not only must PSD contend with potentially destructive attacks from outside and inside the schools, but it must also avoid the appearance of encouraging access by minors to material that the community may find objectionable. Security requires policies and the technical means for implementing the policies.

Security issues cover three major areas: physical security of facilities (e.g., intruder alarms), physical security of technology components (e.g., theft of components), and data/network security (e.g., protection against hackers). The following recommendations address each of these areas in turn:

- *Facility Security:* Perform a needs analysis to develop the functional requirements and specifications for a new security system that includes video monitoring of facilities and is network-based.
- *Technology Component Security:* Determine a method to collect and disseminate security strategies for such issues as the loss of mouse balls and other minor vandalism. Allow for the posting of problems and group interaction to develop new strategies.
- *Data/Network Security:* Although current security provisions are effective, policies and procedures on access and security develop and disseminate to accommodate future growth in both number of users and number of applications.

Developing a comprehensive set of policies and procedures may be some of the most difficult and time-consuming work in the implementation effort. These policies and procedures should define:

- expectations for proper computer and network use
- procedures to detect, prevent, and respond to security incidents

Additionally, a risk assessment should be performed that would identify assets and threats. Security is not absolute and comes at a cost. Cost can be measured in dollars for hardware, software, and staff time; but it can also be assessed in terms of loss of use. The cost of guarding against a potential threat must be weighed against the cost of recovering from it.

The district should authorize and allocate funding to allow schools to upgrade their security systems to incorporate protection for computers, peripherals, and other technologies wherever possible.

Schools may improve the security of technology by:

- installing theft deterrent devices on computers in classrooms
- expanding intrusion alarm systems with more zones and adding dial-up capabilities to security staff/central control
- ensuring that video surveillance covers all areas in which newly acquired technology is concentrated.

Libraries/Information Resource Centers

Many principals and school librarians share a vision of the school library being the hub of information access. If libraries are to survive and grow into information resource centers, the district needs to reaffirm their critical importance. Libraries should also become a priority in the networking process and be upgraded with appropriate technology. The district should consider a standard minimum of eight LAN ports per school library.

Planned updates to the infrastructure will enable libraries to support voice, video, and data (electronic and hard copy) information resources.

To assist school leaders, a working group could be formed (perhaps from Tech Team representatives as well as library/media specialists) to address the following strategies for automating school libraries system-wide:

- research the feasibility of the library system being a central, administrative function similar to other administrative functions (e.g., e-mail, financial, and student information) and compatible with the student information system
- continue with the implementation and migration of the library automation system to a uniform client/server software application in a WAN environment over time
- provide equitable student and staff access to information available over the network (e.g., district learning resources, approved web sites, Providence's public library system, and accessible university library systems)



- develop and implement a plan and timetable for the automation of all school libraries

A district-wide school library system will minimize unnecessary duplication of holdings across schools, allowing individual libraries to develop specialized, in-depth collections. By electronically linking all of the districts' school libraries, these specialized, in-depth collections will be accessible to any student, teacher, or administrator.

In addition to addressing automation challenges, a working group could also focus attention on promoting effective library models, providing professional development, and sharing practices and resources. The working group should:

- communicate to school leaders the important role of libraries as information resource centers both now and in the future
- provide district and school leaders with model configurations for technology-enriched learning environments for libraries
- ensure district-wide professional development plans and programs for school librarians and paraprofessionals to prepare them to manage technology rich information resources and to help students and staff use technology as a research tool
- assess success and replicability of existing library-based models, practices, and resources, and expand the use of successful programs
- design resources to be web-enabled and accessible by all computers at all school sites, and, where appropriate, from home and community centers.

PSD needs to negotiate site licenses with publishers of electronic versions of their books and other print matter. This will enable teachers and curriculum developers to access these electronic books and periodicals and assemble customized, standards-based, teaching materials for use in the classroom. The district network could have access to a variety of online databases such as ERIC for use by educators for professional development or classroom activities. Full text is available from many sources and can be stored on the area/district server for easy access by school building personnel. Teachers and students can have access to current news for research projects. With access to commercial news services, students will be able to search and browse over sixty newspapers and over 200 periodicals, and to listen to live news reports from sources such as the Associated Press.

Students must also be able to:

- access electronic card catalogs and bibliographic databases within and among schools
- perform interlibrary loans, both among schools and with public library facilities
- access library databases within the school, at other schools, and at district offices

In addition, current cataloging can be improved to increase efficiency and accuracy. Books may be purchased that are ready to be placed on shelves along with accompanying cataloging information in electronic form. Where this is not possible, and for non-print items, a fully networked catalog processing service should be implemented.

In order to ensure that the library/media centers become the centers for information resources, the District needs to:

- convene a task force of library/media staff and administration to periodically review and maintain standards and models for school libraries that align with the Districts' learning standards
- develop a set of resource standards for all school libraries that includes appropriate technology to support development of information literacy skills for students
- emphasize to school leadership throughout the District the importance of the role school libraries would serve as information resource centers
- develop and use model configurations of technology-enriched learning environments for school libraries
- develop a system for technical assistance for the library/media specialists
- ensure that the school library receives priority for being connected to all classrooms as school buildings become networked
- ensure that District-wide professional development plans and programs target school librarians in order to prepare them to:
 - manage technology rich information resources,
 - train teachers and students to use technology resources appropriately for research.

5.0 Communications and Network Infrastructure

The electronic environment makes an information level outside the schoolroom that is far higher than the information level within the schoolroom. In the nineteenth century the knowledge inside the schoolroom was higher than outside. Today, it is reversed. A child knows that in going to school he is in a sense INTERRUPTING his education.

—H. Marshall McLuhan, 1967

In today's schools the communications network infrastructure serves as the nervous system. Only when the network infrastructure meets the district's needs will all activities be coordinated, efficient, and effective.

This section addresses the infrastructure requirements for delivery of voice, video, and data in meeting the current and future communications needs in teaching, learning, and administration.

The topics addressed within this section are:

- Networks
- Communications and Internet Access
- Voice and Video Communications

5.1 Rationale

In our society in general and in education specifically technological changes are occurring at an increasingly rapid pace. Providence School District (PSD) must have effective voice, video, and data networks to allow its teachers, students, and staff to improve classroom achievement. The development of effective networks needs to be concurrent with the necessity to train users, troubleshoot problems, and plan for the ongoing evolution of the networks. If technology is to transform the way schools and teachers serve students, it will be through a telecommunications network infrastructure that connects classrooms and schools to district, community, state, and global resources.

Not only must Providence's network meet users' communications requirements in a cost-effective manner, but it must also expand and evolve to meet rapidly changing needs. In addition, if the network is to become a contributor to the district's daily teaching and learning needs, it must be highly reliable.

5.2 Major Findings

Networks

The network thus far has failed to meet minimum requirements for all the schools. As a result, data transfer and communication over the network are not used efficiently or frequently. However, the Chief Technology Officer is in the process of greatly improving the WAN. Video drops in the schools are not being fully utilized. The current data-cabling infrastructure in the schools is often inadequate to meet the current and projected technology networking requirements. Likewise, LAN components are placed in inadequate, insecure, poorly ventilated areas. The district lacks enough central staff to support the network and building-level support personnel are not adequately trained.

Communications and Internet Access

All the schools have access to the Internet and the ISDN Wide Area Network devoted to the REG 2000 application. Currently, the school district has limited Wide Area Network (WAN) connecting the central office with some of the schools. There is a small ISDN network that is being utilized strictly for the REG 2000 student information system in the administrative offices. The ISDN Wide Area Network is slow, is occasionally not operational, cannot access information on other networks, and is not expandable. See Figure 5-1, Current Wide Area Network Design. Each school is responsible for their own external connectivity beyond their internal computing equipment for educational and communication purposes. Most use RINET, provided by the Rhode Island State Department of Education, to connect to the Internet. The Chief Technology Officer has made it a major priority to design and implement a centralized WAN for the District.

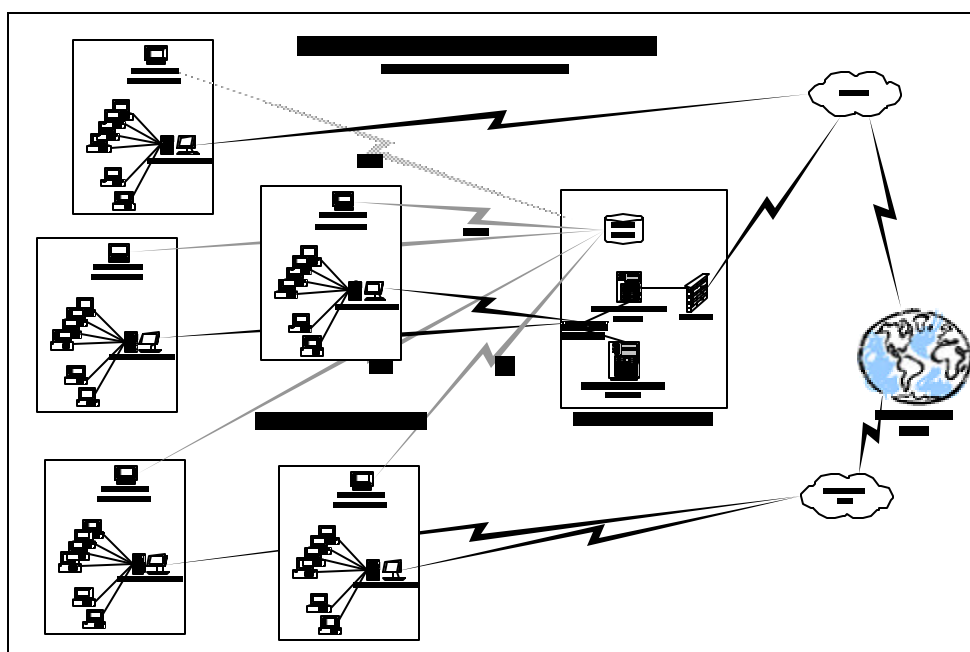


Figure 5-3 Current Wide Area Network Design

Some schools are in the process of developing their own websites that will be linked to the District website. Many staff members do not have individual network accounts resulting in ineffective use of The Local Area Networks (LANs) in the schools. Some students sign in under a common "student" account causing security problems, student management problems and loss of data. Some students and staff save their work on floppy or local drives instead of network file servers which causes similar problems in addition to being costly. The user community is not aware of any network policies and procedures.

The systemic installation and expansion of the District's infrastructure is proceeding according to plan. In order to meet the goal of having four computers connected to the LAN in every classroom, the Providence School District has filed for and received E-rate funding since the program's inception.

During the first year, E-rate funded \$4 million to begin the construction of the data infrastructure. At the end of the second year all but four schools were wired with four drops in every classroom. Overall the District has received more than \$7.4 million. Currently all the buildings and classrooms are wired for data. Though E-rate funds have primarily been used to wire the schools for data, little attention has been paid to other possible uses such as expansion of the phone system.

The schools are looking forward to having the Wide Area Network installed. This network will allow all schools to access programs, files and information from the Central Office and the Internet. New high schools are being established that could be enhanced through the use of E-rate funds.

Voice and Video Communications

A majority of classrooms and the library/media areas do not have telephone access. This impedes communication with parents, students, administration and technology support. Distance learning (video conferencing) facilities are beginning to be made available to the schools through state initiatives.

Many schools do not have access to voice mail for teachers and staff. Although the schools have video drops, much of the cabling is not hooked up or tested. Not all schools have video access in the classrooms. Some schools have televisions in the classroom. There is very limited access to video communications from the Central Office, classrooms and offices. Live video communications are minimal. There is minimal use of distance learning or videoconferencing technologies.

5.3 Major Initiatives

Networks

- Connect all remaining schools to a District WAN and consolidate the existing PSD networks into one.

Communications and Internet Access

- Assign the function, roles, and responsibilities for District website development and the establishment of standards for program, school, and classroom websites.
- Develop and implement policies and procedures for providing all staff and students with individual network accounts.
- Use the infrastructure for the delivery of resources for teaching and learning, administrative efficiencies and advancing communication on all levels.

Voice and Video Communications

- Expand and use the video infrastructure to support full range of traffic including digital or streaming format and two-way communications.
- Provide staff with voice mail services.

5.4 Implementation Approaches

Networks

The goal of the technology system and network infrastructure is to strengthen PSD's educational and organizational effectiveness by:

- enhancing teaching, learning, and management processes through the appropriate application of technology
- improving communications among teachers, staff, administrators, students, parents, and the larger community
- simplifying, expediting, and reducing the costs of administrative tasks and communications

The design should strive to minimize ongoing support costs through:

- *ease of use* -- allows users to solve many problems themselves
- *reliability/availability* -- minimizes occurrences of hardware and software failure
- *maintainability* -- when problems occur or software upgrades are needed, provides effective support from a central location whenever possible
- *supportability* -- enables coordinated school and District support when assistance is necessary, with access to all previously reported problems and their solution

Figure 5-2 diagrams the comprehensive voice, data, and video district-wide network linking all District sites to each other, the community, and the world.

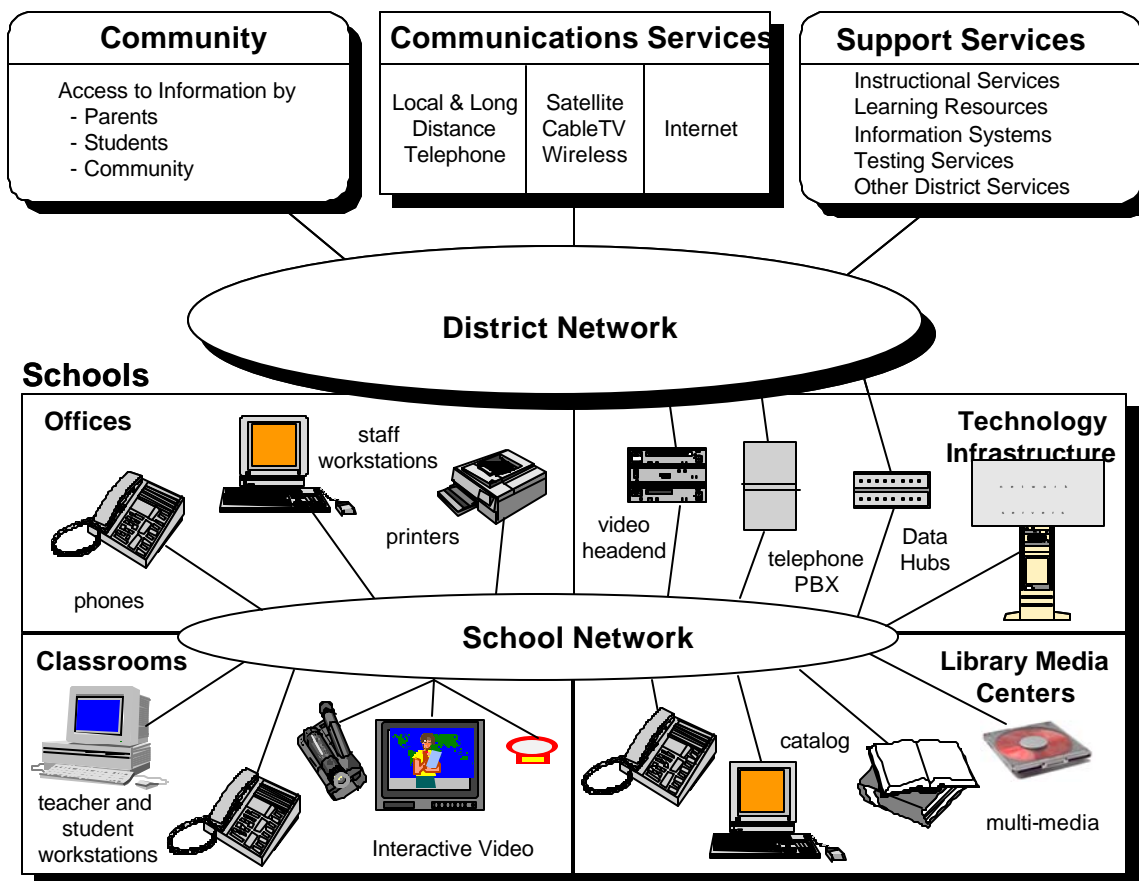


Figure 5-2: District-wide Network

The district should continue to connect all school sites to the WAN and ensure that the remaining schools, once connected to the WAN, have access to administrative systems and e-mail. E-rate discounts decrease the district's liability in wiring of facilities that may be in use for three years or less. Wireless LANs should be considered for those limited situations in which wiring has been delayed, and for the purposes of periodically converting classrooms into Labs. Training may be needed to bring all authorized users up to speed on use of the student information system, financial accounting systems, and e-mail.

School and district administrative staff must strive to build a culture in which e-mail, rather than hardcopy, is the main communications mode. A simple staff survey may help IT Division personnel to identify any training or informational needs regarding e-mail and to guide the provision of any necessary ongoing support services, especially for new, incoming staff.

Demand for Internet usage is increasing very rapidly. Accordingly, PSD must budget and plan for rapid increases in Internet access bandwidth. Increased and improved Internet access should be planned for with RINET to ensure future demands are met.

Eventually, every classroom and office computer will need a network connection. The district must budget accordingly and plan for incremental network expansion. There is a need to provide and/or upgrade servers and switches within buildings throughout the district to support the distribution of Internet access and instructional software. One or more network servers are required at each site to serve as the core of the local network. These servers can provide disk, printer, and workstation integration services. They will appear as a single collection of resources, requiring a single login to attach to all permitted resources across all of the servers. Network servers can perform many tasks, including:

- support for office automation/personal productivity tools
- support for administrative applications
- support for student and teacher applications
- file and print sharing
- restoration of files deleted or destroyed
- e-mail securement
- electronic conferencing, bulletin board, World Wide Web services
- network security, virus protection
- implementation of Internet access policies
- network management
- workstation management
- application software metering

The sites will be increasingly dependent on these servers, so they must be designed to provide reliable service. The network servers will be configured so that they can back one another up in case hardware or software fails. All servers will have uninterruptible power supplies with sufficient capacity to allow orderly shutdown without data loss in the case of power failure. Each server will have a way of backing up and restoring files.

An important strategy would be to utilize school building servers as a backup domain server, with the district office server used as the main server. As a result, each building should have at least one network server in case the WAN goes down. The district may want to consider maintaining the current ISDN network for backup purposes.

Availability of media resources in all buildings will certainly increase. These resources may be effectively shared over the WAN. Hard drives should be considered for use for speed and capacity rather than CD-ROMs. Hard drive costs are rapidly decreasing as their capacity greatly increases. As network connectivity becomes more available and instructional resources become abundant over the WAN, professional development in this mode of operation should be planned and provided for in a timely manner.

Communications and Internet Access

Although e-mail should be the main communication mode, websites should rapidly become the preferred resource for more stable information. Each school should be expected to have a building website by the end of the coming school year. Ongoing maintenance of such sites may be problematic in educational environments. To ensure consistency and accuracy among websites, responsibility for their development and maintenance must be clearly assigned. The district should explore the implementation of an automated site content management system that allows forms-based site creation by individual schools or departments and provides a consistent “look and feel.” Training and ongoing technical assistance may need to be provided to site developers. Standards for program, school, and classroom websites will be important to guarantee quality and uniformity district-wide. As the importance of websites as a public communications media increases, the demand for quality assurance will also increase.

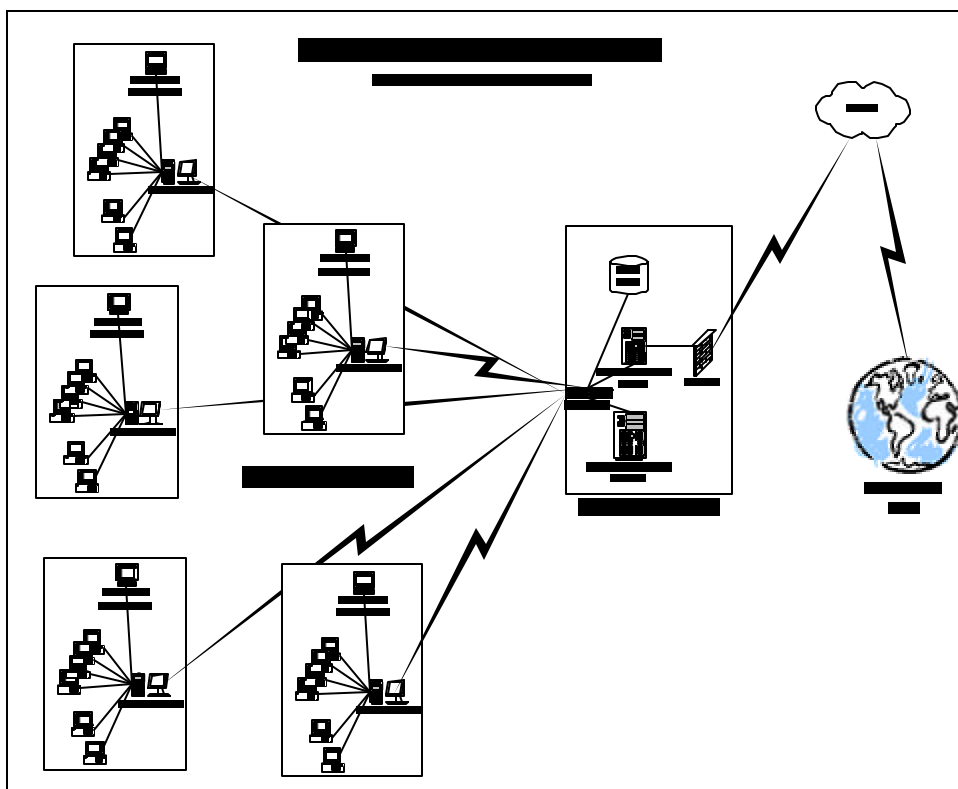


Figure 5-3 Wide Area Network Design

The Chief Technology Officer's new design standardizes the LANs and centralizes host servers at the Central Office. The WAN is being implemented and schools are being added at a manageable pace. The centralized WAN will include services such as access to the REG 2000 student information system and centralized access to the Internet, email, and the District's own Virtual Private Network (VPN).

The REG 2000 application and decision support software will run over the schools' LANs that will be connected to the Central Office servers over the dedicated WAN. This will increase reliability, performance and availability. Once appropriate security measures are implemented, the information could be accessed from any office or classroom computer. This will allow administrators and support staff to enter information easily and allow all eligible staff members to perform inquiries. The WAN will also remove the requirement for dedicated computers since all connected computers will have physical access to all servers. The ISDN network will be phased out once the FRASI/ATM backbone is implemented.

All staff and student accounts and access to the Internet will be managed centrally at the Central Office allowing staff members to access their network files and WAN services regardless of their whereabouts in the district. The design will reduce and prevent redundancy of installing applications, filtering and monitoring inappropriate access and will also allow students to be transferred without out the necessity of setting up new accounts. Lastly, the design will reduce support requirements.

To further improve district-wide communication and organizational efficiency, the PSD should convene a team comprised of school-based administrators, Central Office staff, Technology Coordinators and selected teachers to develop the policies and procedures for communicating between Central Office and the staff. Over time PSD should:

- increase use of software application tools such as electronic bulletin boards, electronic conferencing, and forms management
- create strategies for accessing, storing, and exchanging information resources to the greatest extent possible consistent with the law and district
- implement a district-wide, two-way voice, video, and data network
- procure, install, and configure servers at all sites to ensure a full range of services, including administration services, communication services, and media/instruction services.

The server storage needs to be designed so that students can keep work on the network where it can be secure and backed up. User names and passwords must be assigned to all students and staff to give them the appropriate access to files and applications.

The communications network must be based on national and international standards that enable:

- cost-effective systems through vendor independence
- integration of the widest range of existing equipment
- maximum flexibility to incorporate emerging technology

Some of the important standards incorporated into the design include:

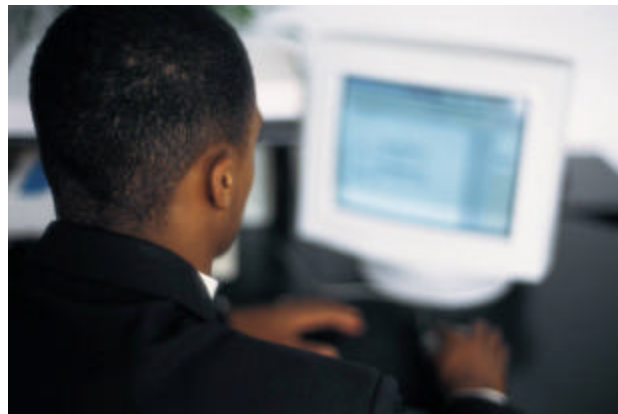
- North American telecommunications network standards
- Internet (TCP/IP) inter-networking standards
- Simple Mail Transport Protocol (SMTP) with MIME extensions for multimedia electronic-mail attachments
- Structured Query Language (SQL) database access standards
- Simple Network Management Protocol (SNMP)
- EIA/TIA 568A building wiring standards
- IEEE 802.3 Ethernet (10/100/1000 Mbps)
- International digital videoconferencing (H.320 series) and data-sharing standard (T.120)
- Moving Picture Experts Group (MPEG) digital video
- American broadcast standards for analog video signals

Network security in a preK-12 environment that is connected to the Internet is more complex than in many other types of organizations. Not only must PSD contend with potentially destructive attacks from outside and inside the schools, but it must also avoid the appearance of encouraging access by minors to material that the community may find objectionable. Security requires a policy and the technical means for implementing it.

Some of the most difficult and time-consuming work in the implementation effort may be in developing a comprehensive set of policies and procedures. These should define:

- expectations for proper computer and network use
- procedures to detect, prevent, and respond to security incidents

Additionally, a risk assessment needs to be performed that would identify assets and threats. Security is not absolute and comes at a cost. Cost can be measured in dollars for hardware, software, and staff time; but it can also be assessed in terms of loss of ease of use. The cost of guarding against a potential threat must be weighed against the cost of recovering from it.



The district should authorize and allocate funding to allow schools to upgrade their security systems to incorporate protection for computers, peripherals, and other technologies wherever possible.

Schools may improve the security of technology by:

- installing theft-deterrent devices on computers in classrooms
- expanding intrusion alarm systems with more zones and adding dial-up capabilities to security staff/central control.

The Telecommunications Act of 1996 established special discounts for schools and libraries under the Universal Service Program. Popularly known as the E-rate, the program distributes approximately \$2.25 billion to schools and libraries.

Providence should continue to apply and take the following steps to maximize the funding that it receives from the program:

- Coordinate procurements, contracts, and implementation schedules, including wiring, to maximize eligibility.
- Apply each year not only for the installation and cost of eligible technology items, but also for ongoing Internet, telephone, and data network services.
- If E-rate projects cannot be completed by the end of the year, establish implementation priorities based on highest E-rate discount levels of the schools to minimize lost funds.

Voice and Video Communications

The District should plan for and implement telephone access in the classrooms for the purposes of safety, security, and enhanced communications. Some of the schools have a clear need for more phone lines to accommodate outside communications. Additional lines may encourage increased volume and increased staff coverage. With this in mind, each building should carefully review its needs and make additional phone lines available on site-by-site basis, as needed. Included in the review should be an assessment of the voice mail capacity of existing systems. Specifications for voice mail systems should also be established and procured as part of the telephone upgrade system. As mentioned above, E-rate discounts may be used to address voice communications systems as well data network services.

Since current access to telephones from classrooms is quite limited, technical support is impaired. Cordless phones installed in each building may be a low-cost solution to help address this problem. The district should consider the acquisition of digital, spread spectrum models of cordless phones that allow longer range and provide privacy.

Today the opportunities for video communications are dramatically expanding as technologies advance and costs decrease. Video services began as a one-way distance-learning tool, using either direct broadcast or videotape distribution. Initially, interactive video services used audio talkback, making it possible for students to talk with the teacher. Over time, the medium has become much more interactive. The district needs to establish a task force composed of all stakeholders who use or plan to use video communications in one form or another to establish a comprehensive approach to video. Include in the task force representation of those interested in:

- administrative videoconferencing
- distribution of video taped programs
- use of cable TV in classrooms
- ITV service to homes
- two-way instructional video

The district should continue and expand upon the use of state funding to provide the infrastructure for video conferencing. Two-way video now allows the instructor and other participants to both see and hear each other at remote sites. Interactive video communications may be used for remote administrative meetings, teacher collaborations, student instruction, and professional development. To effectively use the technology, the district needs to develop and implement a professional development program for using video, distance learning, or videoconferencing.

Additionally, the district should take advantage of educational programming and news related information from Cox Cable which provides free cable links to all public schools in Rhode Island. The programming could be accessed from the classrooms.

6.0 Administrative Computing and Decision Support

If technology is used strategically, it will be possible to more efficiently manage information-driven administrative functions. Such improvements in efficiency can reduce the cost of administration, improve the quality of service, and allow for the redeployment of resources in ways more aligned with the priorities of the district.

—Diana Lam, Superintendent
Rekindling the Dream

A technology system for delivery of accurate, timely, and effective information is critical in an educational environment characterized by a high level of decentralization. This section describes applications, processes, and technologies required for an effective decision-support system.

The topics addressed within this section are:

- Information Management
- Decision Support
- Student Information Systems
- Financial and Human Resources
- Other Systems

These systems must be aligned to the district's goals and support its administrative and instructional planning, operation, and maintenance processes so decisions are made using facts and not opinions.

This section describes the applications, processes, and technologies required for an effective decision-support system as well as the establishment of effective maintenance and customer support systems.

6.1 Rationale

The goal of administrative computing and decision support is to provide central staff, administrators, teachers, and school staff members with technology applications that increase their effectiveness in helping all children to achieve high standards and become prepared for tomorrow's workplace. Information collected, stored, and processed not only must support day-to-day operations, but must also support short-term and long-range decision making at all levels, from the classrooms, to small learning communities, to schools and to the Central Office.

Providence School District' (PSD) Decision Support System must ultimately:

- support the instructional decision-making process, enhance community and parental interactions, and help meet instructional goals
- collect and maintain all electronic information in databases as a normal by-product of, and essential to, day-to-day operations
- train and support users of the system. Ease of use, cost-effective support, and effective development and reporting tools are, therefore, critical design goals
- provide seamless interoperability of all components. Interoperability is best achieved in the long run through the use of widely accepted, open technology standards.

6.2 Major Findings

Information Management

District leadership has expressed the need for planning and decision making to be more data driven. School administrators and Central Office personnel feel strongly that numerous administrative applications and data sources need to be developed or upgraded.

The District would like better access and timelier management information to improve decision making. Although the information generally exists, the District does not have the ability to assemble information easily from its functional databases for tactical and strategic decisions in a timely fashion to support effective decision-making. There is a need for a decision support system that can track education costs for certain kinds of students and perform specific analyses.

Administrators and support staff have often complained about the need to submit paper copies of requests and information for administrative tasks. Many suggested creating and implementing electronic templates for submitting requests and responses for information. Much information is available both electronically and on paper from both the District and in schools, and a great deal of it still flows on hard copy reports. There is a duplication of effort for data entry for reporting purposes. Purpose specific computers exist that do not allow the exchange of information with other systems.

Decision Support

As stated in the framework for reforming Providence Schools, *Rekindling the Dream*, the District has made it a priority to "Increase student achievement through a consistent and comprehensive focus on teaching and learning". The Providence School District relies entirely on a custom student information system, REG 2000 (REG), for managing its student data. An outsourced company, Firm Solutions, developed REG 2000.

Firm Solutions maintains REG 2000 and is currently upgrading the product. There are over 300 users of REG 2000, including the attendance clerk in each school as well as some guidance counselors. However, REG 2000 is not yet available to the teaching staff. Principals, guidance counselors, and administrators are seeking simpler, user-friendly query tools to access and interpret important data from REG 2000. District leadership has expressed the need for planning and decision making to be more research and data driven. REG 2000 has a valuable, long-term store of student data. Insufficient and under trained staffing leads to clerical overload on data collection. As a result, key data elements are often entered incorrectly. PSD administrators and teachers have few resources for analyzing and managing student information to make informed decisions regarding curriculum and instruction. Principals would like the capability for budget reporting at the school level as well as the District level. The short lengths of legacy field names limits legibility.

Because of its unique nature and the need for more customization than other school districts in the state, the Providence School District has been selected as a pilot site for testing a new data query system (Cognos) being developed by the Rhode Island Department of Education. PSD staff members do not have the ability to assemble information easily from REG 2000 for timely strategic decision-making.

Student Information Systems

A student information system (REG 2000) is in place and is supported throughout the administration. Some administrators question the entry accuracy of data within the REG 2000 system. The District chose to develop its own student information system after evaluating numerous commercial packages that did not meet requirements for the large migration of students with specific transportation needs. REG 2000 was originally developed for tracking student records and attendance. New modules such as transportation, scheduling and special education tracking have been added. Other common modules that have been added to REG are discipline, health records, test history, and interoperability with grade bookkeeping.

The Special Education office requires assistance in collecting required data. The capability to track referrals, IEPs, suspensions, and class size has been incorporated into REG and will continue to be enhanced as Rhode Island moves toward a statewide student identification system.

Financial and Human Resources

The district recently began to install a new purchasing system and is working on the HR, Payroll, Benefits, Accounts Payable, Accounts Receivable and budgeting modules for implementation during the first quarter in 2003. The system is being installed and implemented by the City of Providence with input from the School Department. The application was developed and is being supported by Lawson. The district currently uses the ABRA application for HR but it will be converted into the new system when it becomes operational. The employee process will be streamlined since the district will have a single point of entry for employee information.

Other Systems

Edulog is used by the district for transportation applications. It is maintained by Edulog and the PSD technical support staff and runs on a Windows 2000 server with Windows 2000 clients. The food services' and custodial services application is outsourced through Sodexo Marriott. The district is not involved in the day-to-day operations but receives regular reports from Sodexo Marriott as well as issue tracking via the Web through a system used by Sodexo Marriott.

PSD is utilizing a module in the Lawson application for inventory management of school-based technology resources as well as an inventory and fixed asset management systems for new computing equipment.

The Central Office staff responsible for procurement and inventory are researching and planning to implement an automated system once the schools are interconnected over the WAN.

6.3 Major Initiatives

Information Management

- Procure a data warehouse that integrates and enhances existing databases and operational systems.
- Develop and implement standards, policies and procedures to replace manual form reports and data duplication with electronically managed data over the District-wide network.

Decision Support

- Integrate and enhance existing databases through the implementation of a new unified, School Interoperability Framework (SIF)-compliant data warehouse that brings information from many operational systems and makes it available to users through easy to use Web-based data reporting and analysis software tools.
- Select and deploy appropriate user tools that can access the data warehouse to support the information and reporting needs of learning communities and the classroom in addition to federal, state, district, and school needs.

Student Information Systems

- Select and deploy appropriate end user tools that can access the REG 2000, federal, state, and district-level databases and information to support the reporting and decision making needs of the schools.
- Provide upgrades to the REG 2000 system.

Financial and Human Resources

- Work with City of Providence personnel to implement the new Lawson system to its fullest extent.

Other Systems

- Develop specifications for an inventory/fixed asset management system that integrates with existing administrative systems for finance, procurement, and inventory modules in the Lawson application.

6.4 Implementation Approaches

Information Management

The Providence School District (PSD) should consider establishment of an Technology architecture that ties all administrative and instructional applications (see Figure 6-1) together in an integrated multi-vendor environment. This integrated environment would extend from the classroom workstation to the central office and beyond. On the teacher's workstation, it would provide the tools to create, access, analyze, present, and report information. On the server, it would include the systems to secure, manage, store, and distribute information. Effective distributed computing requires standardized interfaces and connectivity, allowing complete integration of information from multiple sources on multiple hardware and operating system platforms. It also facilitates high productivity and easy-to-use tools for users, developers, and systems managers.

The decision support system must fit into PSD' overall application framework to improve access to information allowing the user to do what is expected of him/her. The framework encourages use of Web-based interfaces to applications where it makes sense and creates district-wide repositories that can be used by multiple applications and all users.

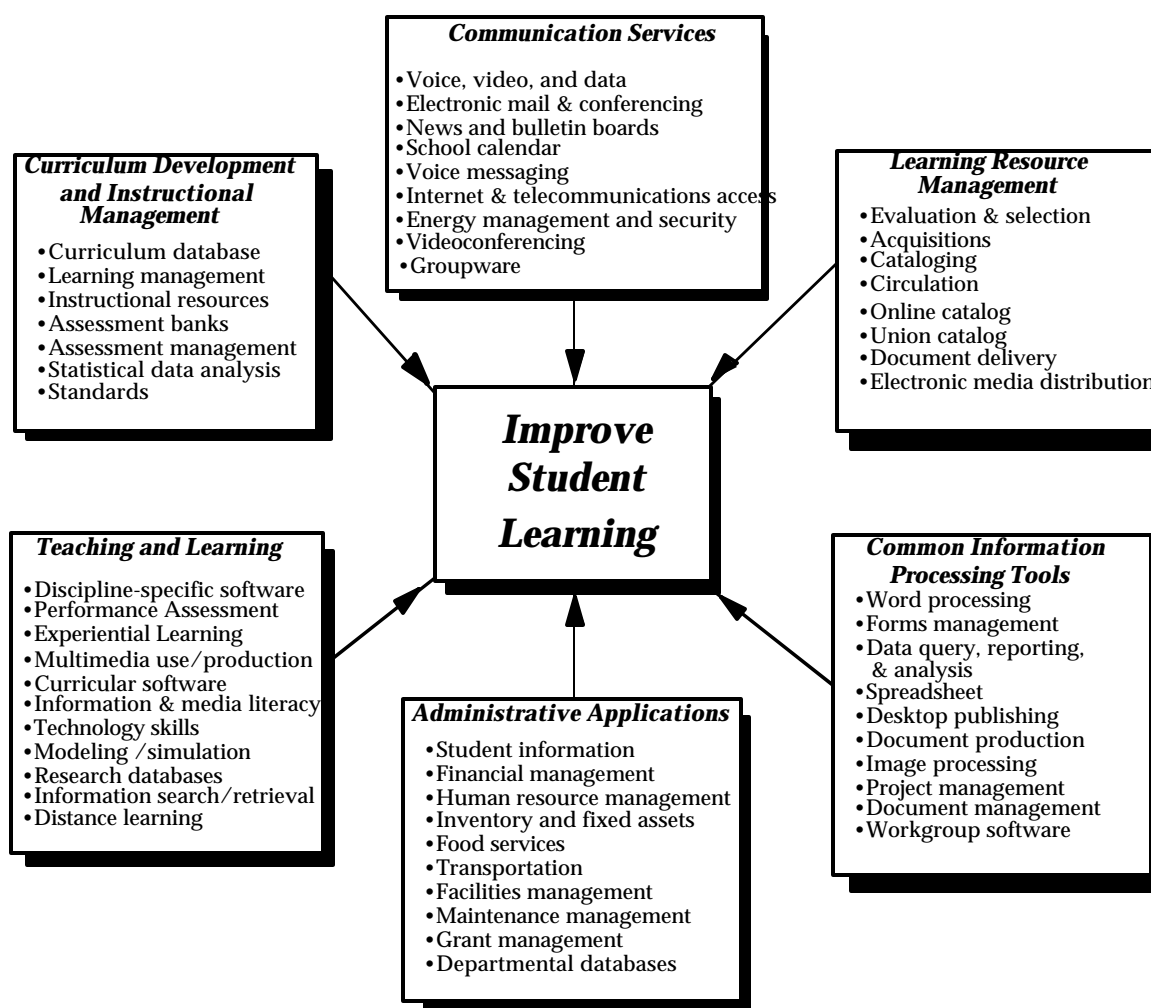


Figure 6-1: School District Networking—New Dimensions in Communication, Administration, and Instructional Management

Decision Support

Decision support has many different meanings. In its simplest form, decision support is accessing and transforming data collected by day-to-day operations into useful information that can be acted upon in making quick and accurate educational decisions. Often this involves analyzing how the data (e.g., budget, enrollment, student achievement, etc.) has changed over time by comparing it to current data. This ability to compare plan-to-actual is essential when managing the attainment of educational and business performance objectives.

Presently it is difficult for staff to query, analyze and report data from multiple applications (e.g., student data, employee records). To address this problem, data from all operational systems could be brought together into a central repository. *Data warehousing* is the term that describes the process by which information is extracted from a variety of sources inside and outside the District and stored in a separate database for decision support. Data from all operational

systems may be placed in a central repository that is optimized for data query, reporting, and analysis of information across multiple functional units (see Figure 6-2). Additional information, such as census data, can supplement the information in the district's operational databases.

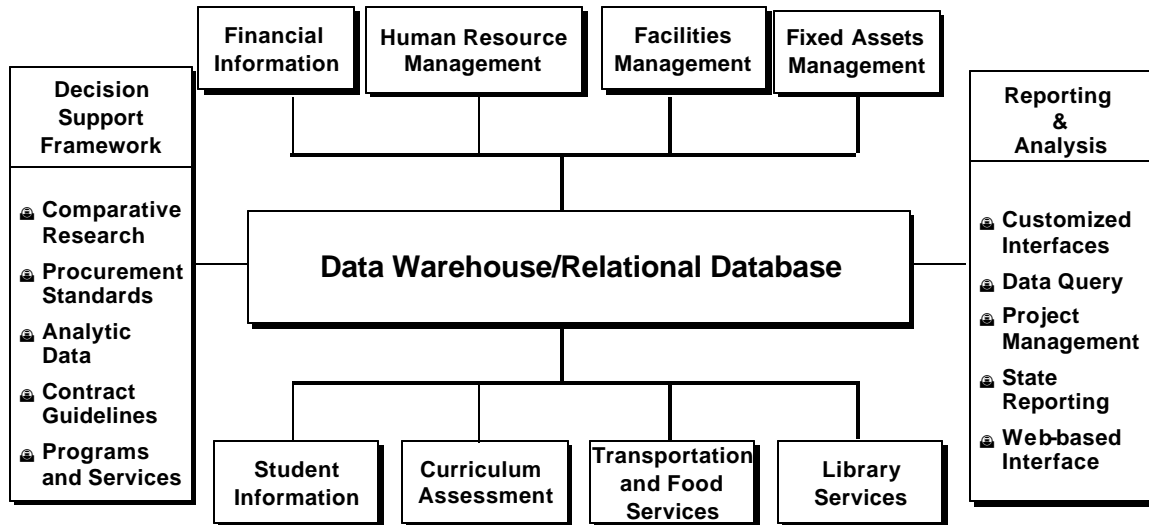


Figure 6-2: Information Management System

PSD should also implement a forms management system as part of its information management system. When implementing such a forms management system, the existing school and district forms will be reviewed to determine if they are still necessary or whether they could be replaced by another redesigned form. Whenever possible, existing data will be pulled from databases to eliminate re-entering of known data. Data entered into forms would be placed into databases with no further need for retyping. The forms management system can speed up processes and reduce errors.

Decision support systems (DSS) are comprised of a broad range of functions and support many different users such as the casual user, the application developer, the analyst, and the administrator. As a result, DSS tools must provide a scaleable solution for a broad range of uses, including executive information systems, multimedia, and specialized geographic and statistical analysis tools. Graphical user interfaces (GUIs) are important to users for increased productivity, ease of use, and more rapid decision-making by offering flexible, innovative visualization tools. (See Figure 6-3.)

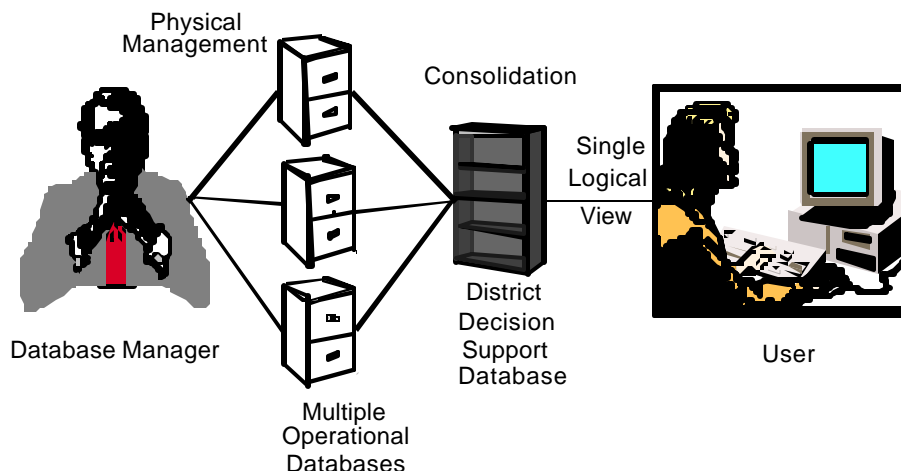


Figure 6-3: Consolidated Decision Support Database

Critical to the entire database approach is the development of an effective data model. PSD will develop a district-wide, user-oriented data dictionary to standardize all data elements, the relationships among them, and the business rules that govern them. These data elements, relationships, and rules will be common across all administrative applications.

Data must be extracted, cleansed, and, when codes are used for fields, transformed into a common definition before loading into the data warehouse (see Figure 6-4). For example, the student and human resource systems might use different codes for ethnicity, which must be mapped into a common definition to allow analysis of data across all systems. The data could then be reported and analyzed using a variety of tools most appropriate to the user's needs.

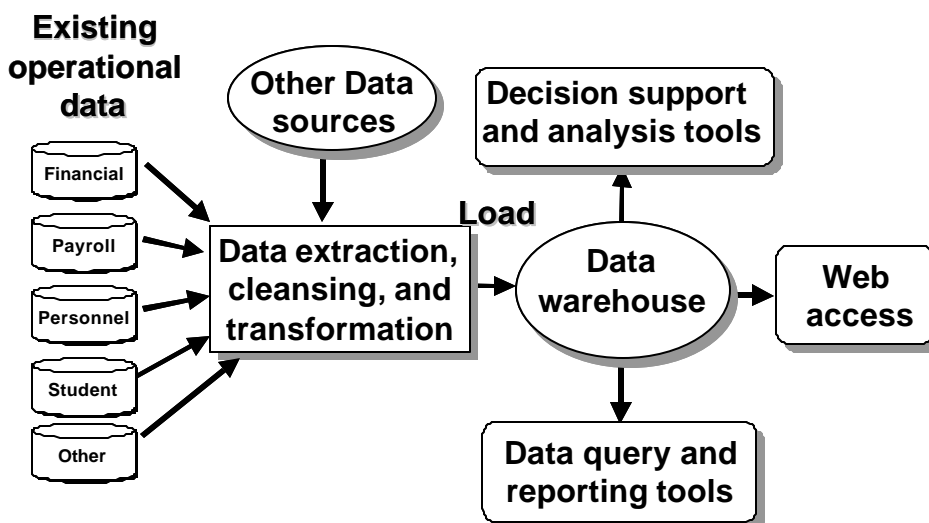


Figure 6-4: Data Warehousing Process

Obtaining and integrating data from many different systems is the most difficult, time-consuming, and expensive part of creating a data warehouse. The Schools Interoperability Framework (SIF) was established to address this problem. SIF is a K-12 industry and educator supported initiative to allow administrative and instructional applications developed by different vendors to exchange data with each other. SIF achieves interoperability by defining:

- standard naming conventions for this shared data
- standard formats for shared data (e.g., student demographics information)
- standard codes for shared data elements (e.g., ethnicity codes)
- rules for interaction among different software applications

These shared standards enable the transfer of data among programs seamlessly in real time or through batch data exchange, without the need to re-enter data or to purchase expensive add-ons or third-party data transfer programs. Since SIF is vendor and platform neutral, it will enable different applications to exchange data efficiently, reliably, and securely regardless of what platforms are hosting the applications.

The SIF data exchange will be the core strategy for cost effectively populating and maintaining the comprehensive data warehouse of school and District data (see Figure 6-5). PSD will require future administrative and instructional applications to be SIF compliant and will seek to obtain SIF compliant versions of existing applications.

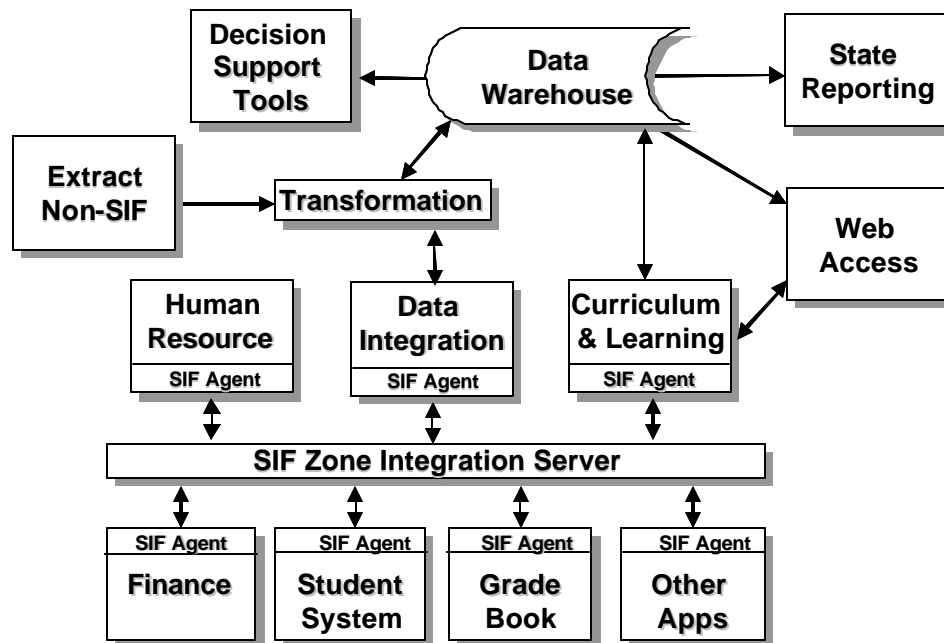


Figure 6-5: Data Integration Strategy

Early implementation of a data warehouse will pay big dividends. It will allow web access to information in existing applications without having to wait for a replacement system. It can insulate users from the transition of existing applications to new applications. The users will access the data with the same tools in the same way even though the underlying applications change. PSD can begin by outsourcing the research and development of a set of functional requirements for the data mart/data warehouse production as well as the technical specifications for data warehouse design and development. Over time, information on students, finances, and employees will be incorporated.

Providence should standardize a set of common information processing tools to be used by network participants by selecting applications that, to the extent possible, are effective and can operate on both Macintosh and PC computers. By choosing applications based on this criterion, Providence School District will more easily transfer documents across the network. These documents can then be consolidated, revised, and printed, regardless of the type of workstation on which it was created. In addition, a standardized suite of common tools will simplify use, lower training costs, and minimize the cost of supporting different software applications performing the same function. These common network applications should be:

- easy-to-use and should have a graphical-user interface (GUI)
- e-mail and Web-enabled
- able to access structured query language (SQL) and ODBC databases
- able to use a consistent set of keystrokes and icons standardized across as many of the applications as possible
- able to access the data formats of other applications, ideally without requiring conversion

These standards are necessary to ensure that the look, feel, and operation of documents and data are retained if they are moved from one person to another or between different client platforms.

To maintain data integrity, no data files created by applications, other than temporary files, should be kept on the Macintosh or PC. The local disk should be used primarily for temporary files, disk caching, virtual memory swap areas and frequently used applications.

PSD should take the following steps to implement a district-wide decision support/data warehouse system:

- Develop an information architecture that supports district functions.
- Develop a dictionary of identified data elements that describes element storage, location, content, meaning, and validation.
- Identify data to be extracted from operational systems and develop data extraction/ cleansing routines.
- Create a unified, non-technical user data dictionary of relevant information. A user will not need to know on which system the data is stored to access it.

- Research and write functional requirements and detailed specifications, and procure a data mart/data warehouse.
- Continue to expand WAN to all sites and connect workstations to LANs to provide access to data warehouses from any workstation.
- Establish the update frequency of data from different systems to the integrated operational database.
- Web-enable the data warehouse to provide maximum but secure access.
- Identify unmet reporting and decision support needs of classrooms, schools, and district departments. Identify different types of tools that might best address different decision-support needs. Ensure that all new software procured supports all reporting levels used by PSD. Ensure that the most common needs can be met with a Web-based tool.
- Research and write functional requirements and detailed specifications, and procure decision-support client software.
- Implement easy to use reporting tools that allow users to obtain information when they need it in the proper format without requests to IT for special reports for most of their data needs.
- Develop data access profiles based on job functions. Develop standard views of the data and standard reports.
- Provide training to users and IT staff on how to use tools to improve decision making.
- Expand access to existing applications through the use of software that makes the data accessible through Web browsers operating over the new WAN network.
- Make extensive use of Open Database Connectivity (ODBC) to access data on different systems and databases during the transition.

PSD should start with the implementation of a data warehouse in a specific functional area that can evolve into a district-wide warehouse. The implementation of a data warehouse in a functional area is often called a data mart. Whether a data mart is developed centrally or by personnel in a functional unit, the central information group must have the responsibility and authority to ensure the integrity of the evolving overall district-wide data warehouse.

Listed below is an overview of potential requirements for the Decision Support System:

- The user interfaces of data analysis and reporting tools for the DSS must be as user friendly as possible, and must accommodate all ranges of computer experience in the District.
- The data needs to be available to all appropriate users through easy-to-use data reporting and analysis software tools.
- A unified non-technical user data dictionary of relevant information should be created so that a user need not know on which system the data is stored in order to access it.

- The update frequency of data from different systems to the integrated operational database needs to be established.
- The DSS must provide up to date progress reports on the Superintendent's Indicators of Student Achievement to users at all levels of the District.
- The DSS must provide ad hoc analysis capabilities that allow users to examine the relationships between a wide range of variables and measures of Student Achievement.
- The DSS must support tracking of a wide range of possible measures of student achievement including multiple performance assessments throughout the school year.
- DSS must provide easy access to reports that disaggregate student information databases needed to answer commonly requested breakdowns.
- The DSS must include student information from the District's REG 2000 student information databases needed to answer commonly asked questions.
- The DSS must provide easy access to standard reports with appropriate content and scope to meet the needs of users in different roles in the District.
- The DSS must integrate data from all key District databases including student, personnel, financial, and other types of databases according to milestones set by the vendor and agreed to by District.
- Information in the DSS should be capable of being updated or refreshed on at least a daily basis.
- The DSS must be capable of handling the growth in the number of different types of queries (without architectural changes) as the data in the DSS becomes more diverse.
- The DSS must allow the addition of new data fields and formulaic transformations of data with a minimum amount of work.
- DSS predefined reports must be accessible from common browsers, including Internet Explorer and Netscape.
- The DSS should be capable of restricting access to information according to the role and/or identity of the user.

Student Information Systems

There is a district-wide commitment to making the system work for all users. A committee of users should be established to study the next generation of REG 2000 to bring data to teacher desktop for purposes such as accessing daily attendance, report cards, IEPs, etc. Simple queries have been developed and the number of drop down fields have been increased to improve data input accuracy. All problems that school administration and other REG 2000 users are experiencing must be carefully documented before the training takes place so that the training efforts directly meet the needs of participants. Ongoing training

must be provided as soon as possible to building administrators, appropriate system support staff, counselors, and all other end-users. Training approaches need to be designed to fully meet user needs rather than be a single event within a pre-determined time span. As the application becomes more widely available, training should also be scheduled onsite at the school buildings. Guidance counselors in particular need to be fully competent in appropriate modules of the system and receive subsequent high-level access to the scheduling system and its features for reviewing and modifying individual student schedules. Ongoing user groups' meetings should be pre-scheduled throughout the year to deal with emerging issues or to refresh on seasonal student information activities.

Availability and accessibility of student health records and emergency information by school nurses and other authorized personnel are important to the district. The acquisition of a health record management module linked to the SIS and accessible via the district wide area network has been an important support tool to schools and students. Clearly, the health records are only be accessible by



appropriate workstations and authorized users.

A special education application that can be linked with the SIS and that provides an automated Individualized Education Plan (IEP) system has been implemented. Since the district is committed to using the REG 2000 system which will be vital to the successful implementation of a decision support

system, the district needs to budget appropriately for the upgrades, maintenance, training, and access for all the staff.

Financial and Human Resources

The Financial and Human Resources system developed and supported by Lawson, appears to be sound. Over the next three years PSD should be to work closely with the City of Providence to ensure that the requirements of the district are met. A school end-user group may be formed to serve as a liaison with appropriate City of Providence personnel to discuss any problems regarding features, operational issues, and training.

Other Systems

Within the parameters of anticipated resources, a master procurement, allocation and tracking program and schedule should be developed for instructional computers and peripherals that specifically addresses equity of technology access throughout the District. The District should analyze and monitor current schools' progress toward critical mass utilizing an inventory database populated by information from the inventory surveys that are provided annually. The survey instrument should ultimately become a web-based data-gathering tool and the district-wide inventory database placed on-line with electronic search capabilities for each school office.

District-level reports should be created from both the inventory database and future procurement system that depict the distribution of quality resources, provide schools and clusters with comparative data, and flag inequities. Principals should be involved in the design of useful reports. The deployment of assistive/adaptive devices for special needs populations should be included in analysis and reporting procedures. The task of auditing and monitoring equitable access to technology resources should be assigned at the district level.

7.0 Human Resource Management and Organizational Development

It is now well understood that the challenge of integrating technology into schools and classrooms is much more human than it is technological. What's more, it is not fundamentally about helping people to operate machines. Rather, it is about helping people, primarily teachers, integrate these technologies into their teaching as tools of a profession that is being redefined through the incorporation process.

—K. Sheingold, “Restructuring for Learning with Technology: The Potential for Synergy”

The human resource management and organizational development section of this plan addresses the staff development, support services and organizational issues that are essential to technology integration.

The topics addressed within this section are:

- Staff Technology Competencies
- Staff Development Planning and Programs
- Technology Staffing Support
- Organizational Development

7.1 Rationale

Training and ongoing support are essential if all teachers and instructional staff are to incorporate appropriate technology resources into teaching and learning. The effective management of technology enhanced learning environments requires that teachers be provided with staff development and ongoing support to artfully select and utilize the technology resources that can best address the learning standards, critical mandates, and individual learning needs of their students.

Staff development is the formal means by which PSD promotes the continuous learning and improvement among teachers and instructional staff. Many district and school leaders recognize that reactive training interventions and stand-alone workshops cannot keep pace with the formidable standards and mandate-driven development needs. It is clear that efforts need to be coordinated and focused on high priority needs, and that technology must be routinely integrated into the content, delivery, and management of staff development.

PSD leaders understand that staff development requires a three-phased process of education, training, and support. “Education” builds vision and awareness; “training” develops specific knowledge, skills, and behaviors (competencies); and “support” provides the ongoing reinforcement and assistance required for sustained learning.

The foundation for effective training is competency-based staff development planning. The identification of technology competencies, along with other instructional competencies, will help to align staff development with critical priorities directly related to improved student learning.

Another essential component of successful integration is adequate technology support services. PSD is large enough to warrant some support services being decentralized to the school-level to meet the growing demands of more users with access to more technology resources. It is important to set district-wide guidelines and identify funding strategies to ensure that all instructional, administrative, and support staff, and the students they serve, are provided with reliable support services to maintain and repair technology resources and coordinate upgrades and procurement.

7.2 Major Findings

Staff Technology Competencies

There is a wide range of technology proficiency among PSD district staff. One major contributing factor to these discrepancies is inequitable access to technology resources across the district. PSD staff express interest in identifying teacher technology competencies modeled on ISTE standards and the Milken Staff Development Compendium guidelines. Technology competencies have not yet been identified for principals, school support staff, library-media staff, school and district technology support staff, and district-level instructional staff.

Staff Development Planning and Programs

Descriptions of technology training and development opportunities do not routinely use competency and performance-level language to enable staff to select programs that best match their needs. Staff appreciate the quality of the training provided, but are sometimes frustrated when they are trained using technology resources that are not easily accessible back at their schools.

Currently, most staff development is provided through school-based or district-sponsored workshops, but there is interest in using technology to deliver more varied and effective staff development options, such as distance learning; online tutorials, courses, and discussion groups; and Internet research. Another source of training is the Department of Education and University of Rhode Island RITTI program, although this program has not been widely used by principals and teachers.

There is a need to coordinate all technology-related development activities so that staff development is efficiently and equitably delivered. Staff do not currently develop multi-year individual staff development plans aligned with district/school/department improvement goals and their own unique needs.

Technology Staffing Support

The Technology Department is made up of the Chief Technology Officer, the Instructional Technology Director, and ten technicians. Support for the REG 2000 student information system is one of the services that is outsourced. Although the technology support staff are highly regarded for their expertise and Herculean efforts, it is recognized by school- and district- based staff that the current level of technology support staffing is inadequate to meet existing needs. There is considerable concern that the support services will be even more strained as additional technology resources are brought into the district and the WAN is established.

There are no district-wide guidelines, policies, or standards for school-based technology support. A few schools have school-based technology coordinators. However, most school-level technology support staff tend to be library-media specialists, technology lab instructors, or a part-time or full-time teachers who do technology support between assigned duties, or before and after school. These designated school technology coordinators do not routinely meet and share experience and learning. There are no established strategies to train and support these school-based technology leaders.

Organizational Development

The roles and relationships among district level staff development, instructional technology and Technology staff are unclear. Currently, there is not a formal secondary student technology leadership program. However, a new high school is being established with the goal of better preparing students with the technology skills needed to pursue high technology careers. There is no mechanism for managing human resource data aligned to student learning standards, District strategic goals, and school improvement priorities.

7.3 Major Recommended Initiatives

Staff Technology Competencies

- Identify technology competencies and performance levels for teachers, instructional support staff, library-media specialists, administrators, clerical staff, and technical support personnel.
- Include function-related technology competencies into human resource activities, such as, recruitment, hiring, staff development, supervision, and evaluation.

Staff Development Planning and Programs

- Encourage more teachers and principals to participate in the Department of Education/University of Rhode Island RITTI program to build their technology competencies.
- Establish a comprehensive staff development planning model to address the needs of all staff that includes parameters for district- and school-level technology training.
- Incorporate targeted technology competencies and performance levels, prerequisite skills/experiences, and required hardware/software into all descriptions of technology-related staff development activities.
- Expand delivery models for technology-related staff development to make more learning options and time frames available for staff.
- Develop and implement a competency-based Individual Staff Development Plans (ISDP).

Technology Staffing Support

- Establish district-wide guidelines and standards of service for both school-based and district-level technology support services.
- Build the capacity of school-based staff to perform simple maintenance and basic trouble shooting tasks.
- Establish meetings for school-based technology staff to meet, share learning and address common issues.

Organizational Development

- Engage in function-based organizational analysis to determine optimal structure and staffing for district-level technology support services and to clarify roles, relationships, and critical interdependencies.
- Implement a student leadership program to supplement school-based technology support.
- Develop as part of a district-wide human resource system, the capacity to store, manage and query personnel and competency-based human resource data.

7.4 Implementation Approaches

Staff Technology Competencies

Identifying district-wide technology competencies and performance levels for staff is the first step in improving technology-related staff development. It is recommended that PSD adopt ISTE's NETS for Teachers. Once the technology competencies have

been determined, they can be incorporated into recruitment and hiring practices, job descriptions, staff development programs, and supervision and evaluation processes. An important resource for accomplishing this work is *NETS Standards for Teachers: Preparing Teachers to Use Technology*, ISTE, 2002.

At some schools there are library-media staff with extensive knowledge and skill in supporting teachers' technology integration efforts, but this level of technology competency is not universal in schools across the district. It is important to establish statewide library-media technology competencies that are aligned with guidelines of the American Association of School Librarians. As with technology coordinators and other technical staff, once competencies are defined adopted, sample competency-based job descriptions could be developed to assist districts in the recruitment, hiring and ongoing development of library-media staff. Skilled library-media specialists can be important members of the school-based leadership teams described in Figure 7-2, page 81.

The technology competencies of District and school staff who provide teachers with integration training and support vary widely. For example, the District has initiated a successful mentor program to help teachers redesign the curriculum to address literacy and numeracy improvement priorities. The mentors have been well-received, but technology is not routinely used by the mentors to support the literary and numeracy redesign.

The recently released *Technology Standards for School Administrators* includes technology competency guidelines relating to "teaching and learning" and "assessment and evaluation" that are particularly appropriate to district curriculum and instruction leaders and/or department heads for various disciplines. It is recommended that these standards, which were published by ISTE as NETS-A in March 2002, be adopted and used to promote the development of technology competencies in principals, district instructional leaders, and other administrators.

Technology leadership by the principals is a critical if technology is to be integrated into schools. PSD needs to set expectations that principals and other administrators will model technology integration in their daily functions and communicate to staff and parents how technology can help their schools address high priority school improvement needs and district mandates. In addition to providing development activities focused on technology competencies related to administrative and management functions and personal productivity, structured opportunities that enable principals and instructional leaders to improve the following leadership-related technology competencies also need to be provided:

- an understanding of, and the ability to build and communicate, a shared vision of technology integration as necessary to school improvement and essential to effectively addressing the district's curricular priorities and instructional mandates
- coaching and oversight skills to assist teachers in the integration of technology into major role-related functions

Yet another critical resource is *Making Technology Standards Work for You: A Guide for School Administrators*, ISTE 2002.

The Chief Technology Officer, Instructional Technology Director, and Curriculum Integration Specialist could collaborate to develop a PowerPoint™ presentation for principals to use to develop this shared vision.

Because all schools do not currently have equal technology resources, it is important to align expectations for staff competency development to the level of access to technology. For example, development of Internet research skills can only be expected of staff having access to the Internet in their daily work environment.

Staff Development Planning and Programs

PSD should promote highly increased participation in Department of Education and University of Rhode Island RITTI program for teachers and principals. This summer program is a valuable resource for engaging educators in focused technology competency development. In the past, participants have been provided with laptops to continue their integration of technology into daily professional practice and enhance their personal productivity. This is another reason why this state professional development resource needs to be more fully utilized by PSD educators.

As evidenced by contemporary research and the PSD aspirations for technology integration, educators must expand their view of staff development beyond the traditional workshops and beyond applications-only training. As staff become more proficient with technology tools and applications through targeted training activities, they need ongoing support and access to site-based technology support to reinforce learning and sustain their continuous improvement and development. Once a WAN is operational, technology can be used to provide this ongoing technology integration support in the form of e-mail communications, online tutorials, discussion groups, and access to online research and materials.



The state has initiated a robust distance learning program for Rhode Island schools. Distance learning can be used for professional development, as well as, expanding the learning opportunities for students. PSD should take greater advantage of the state initiative and use distance learning for delivery of staff development.

When exemplary development activities are provided within the district, distance learning can be used to share these experiences with teachers across the district to eliminate travel time and impact more participants.

The mentor who are helping teacher redesign their literacy and numeracy curriculum need to be trained to imbed technology into these initiatives. Instructional leaders at every level need to think of technology as an essential tool to support curriculum improvement priorities, not as an artificial add-on. Models or examples of successful integration of technology in priority areas such as literacy and numeracy should be developed and incorporated as a standard portion of all District training programs. One method of training could require teachers to create some technology integrated

“product or process” that can be taken back and used in their classrooms. Follow-up support and discussion of teachers’ use of the “product or process” would further enhance technology integration efforts.

Technology-related staff development is currently provided by various groups within the District, but the efforts are not coordinated. Promoting collaboration between the newly appointed Curriculum Integration Specialist and Director of Instructional Technology would enhance coordination efforts in effectively integrating into curriculum and instruction. The scope of the Curriculum Integration Specialist responsibilities need to be clarified and expanded to include the active solicitation of DOE funding, programs and resources that would benefit the District’s technology-related staff development efforts. To insure continuity and eliminate unnecessary redundancy, PSD needs to determine the scope of staff development services that will be routinely provided at the district- and school-levels.

Further continuity and coordination can be promoted by adopting a staff development planning model and processes that promotes the alignment of staff development with District priorities and mandates, and school improvement goals. The staff development planning model and processes should take into account how technology can be used as a tool to:

- assess competency-based development needs and priorities
- market staff development opportunities
- research best practices and effective models of staff development
- engage in ongoing collaboration, communication, support, and technical assistance
- evaluate the effectiveness of development activities, i.e., the impact on practice using multiple assessment strategies
- schedule, track, analyze, and manage staff development activities and data
- provide confidentiality and security of human resource data

To promote competency-based staff development, video-based training models can be designed to include exemplars of what staff technology competencies look like when applied to daily instructional and administrative practices. In addition, some schools have developed successful strategies and practices for school-based technology staff development, such as; collegial workshops, tutorials, peer modeling, coaching, mentoring, the development of student technology leaders, and distance learning options. These successful strategies and models can be shared online among all the schools in the district when the WAN is fully installed.

Strategic planning is the foundation for building a contemporary, competency-based staff development system that is grounded in the principles of continuous improvement. Competency-based staff development plans at the school and district level can be developed and implemented enabling all staff to focus staff development on critical mandates and high-leverage improvement goals. In addition, strategic planning and competencies linked to high priority needs and mandates help focus other competency-based human resource management initiatives, such as recruitment, selection, supervision, and evaluation, as illustrated in Figure 7-1.

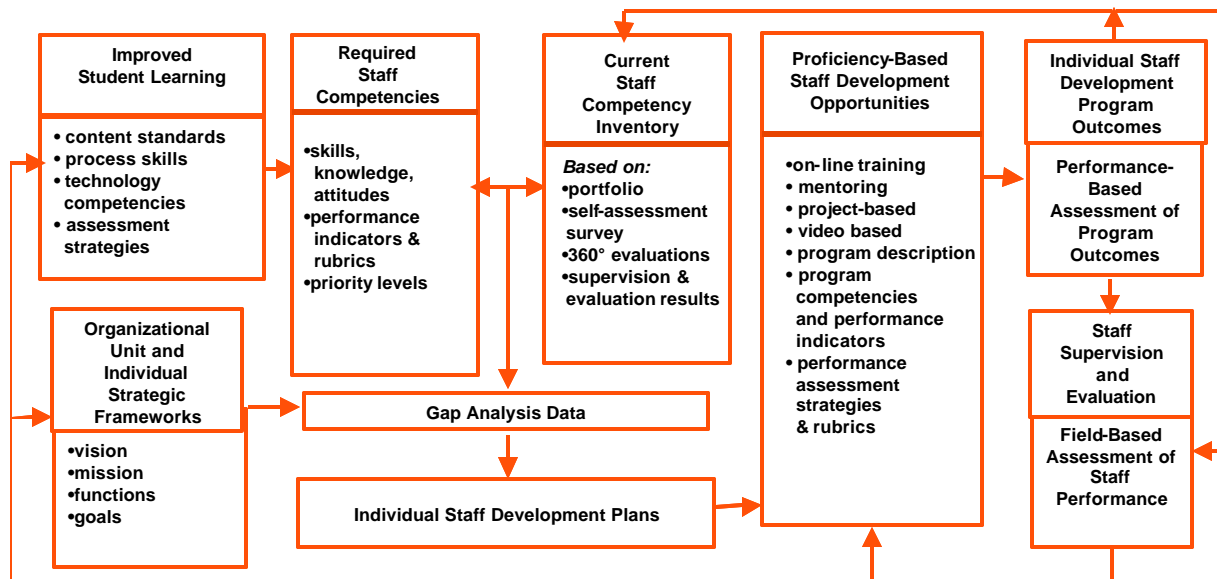


Figure 7-1: Competency-Based Staff Development Model

The competency-based systems approach to staff development represented in Figure 7-1 is founded on the following beliefs:

- Every adult has the capacity to be a self-directed, lifelong learner when provided with quality development information and resources.
- Every adult has the capacity to design and implement effective individual development plans that address growth and improvement priorities aligned with the strategic goals of the District and schools.
- Continual, systemic improvement is directly linked to the ongoing learning of all individuals and groups.

Identifying competencies with multiple performance levels recognizes that competency development is a continuum. The five stages of development outlined in the Apple Classroom of Tomorrow (ACOT) study reflect this idea of a developmental continuum:

- *Entry Stage* — staff struggle with the changes that technology brings to the work environment
- *Adoption Stage* — staff master new technologies at a basic level of understanding
- *Adaptation Stage* — staff recognize the potential of technology tools for personal productivity
- *Appropriation Stage* — staff master specific technology applications and integrates them into daily activities
- *Invention Stage* — staff mentor and coach others to expand technology skills across teaching and learning environments

To begin a transition to competency-based staff development, it is important to require that all providers of technology-related training identify the targeted competencies and performance levels in descriptions for courses, workshops and other development activities. The program descriptions also need to identify any prerequisite competencies or experiences, and the minimum hardware and software requirement to ensure that participants will be able to practice their new learning upon return to school/work sites.

Eventually staff development planners in PSD will be able to use appropriate technology to schedule, promote, deliver, support, and track training activities. As more up-to-date resources become more accessible and connectivity is routine, all planners and providers of staff development should use appropriate technology to support the District's major mandates and high priority initiatives. For example,

- Mentors can be trained to embed technology into the curriculum redesign process. Promising literacy and numeracy practices can be documented and shared throughout the district through e-mail, listservs, and online discussion groups.
- Teachers can be trained in the use of technology to provide and document multiple student assessments to help track progress toward promotion and gains in literacy and numeracy.
- Strategies for effectively using classroom technology resources can be part of a classroom management module for beginning teachers.
- Orientation and training for new administrators can set expectations for technology competency development for school leaders and their staffs.

PSD teachers need additional training and/or ongoing support to improve student literacy and numeracy. To meet this and other critical needs it is essential that PSD expand technology-supported delivery options for staff development. Since there are viable models for on-line courses and development resources currently available, a good starting point is to identify these and provide school personnel with printed and/or on-line information on sources that could meet their technology competency development needs.

On-line staff development holds promise for PSD. Efforts to complete the network infrastructure to connect all buildings in the District are vital in order to provide these staff development opportunities to all staff. The next step would be to develop and implement a process for updating information on on-line courses and resources. At the district-level, it is important to identify higher education, community, vendor, and corporate partners for developing and implementing distance learning delivery models that focus on staff development priorities in support of the PSD strategic goals, such as improved student literacy and numeracy. Competency-based staff development delivery options that can be researched and developed include:

- online training and demonstration models
- online courses and programs
- two-way video conferencing
- cable broadcasting
- project-based learning with on-line coaching

- online discussion groups
- other models of asynchronistic learning

There are vendor provided online courses for developing technology competencies that can be cost-effective for larger districts. Some focus totally on applications training, while others provide programs to support technology integration into teaching and learning. Some vendors have modules to support the development of technology leadership competencies. A key consideration is to require vendors to align any training programs to state standards and District initiatives. When conducting vendor programs, the following features can be considered:

- flexibility of course delivery, e.g., delivery via CD, DVD, video, on-line
- customized grouping of modules
- easy loading and removal of courses
- linkage to technology competencies and performance levels identified by PSD
- pre-assessment to determine the appropriate proficiency level or specific elements needed by learner
- ability to enter and participate in short tutorials for “just-in-time” training in specific features of an application
- clear alignment of integration training to curriculum standards
- ongoing assessment and tracking of learners’ progress, e.g., training management system based on interface standards for easy import and export of data
- self-paced instruction
- use of simulations and research-based models
- ongoing support through online access to instructors and resources, e.g., discussion groups, frequently asked questions (FAQs), bulletin boards, etc.

When an outside vendor is used to develop content for online offerings it is important that they be customized to align with major District initiatives. Some of the online programs can be very rigorous. To avoid high attrition, it is important to clarify in the program description any prerequisites, and the expectations of time and effort necessary to successfully participate in the online program.

Technology Staffing Support

The current Help Desk is able to provide limited technical support to users. Efforts are constrained by the variety of software and hardware bands and versions to be supported. It would be useful to clarify the district-wide hardware and software standards that will be supported by the Help Desk and communicating these standards to school leaders to guide their decision making.

There is not a clear vision for what school-based technology support should look like in PSD. As more technology resources become available, strategies for addressing the support needs of school-based users should be implemented. It is recommended that the District adopt a triangular model for technology leadership that includes the superintendent, the district technology coordinator, and district administrator for curriculum and instruction. A parallel model would also be useful at each school (see Figure 7-2). Titles vary, but leadership teams need to include those individuals performing the functions of:

- Chief Operating Officer for the district and for the school
- district/school-level coordinators of technology resources and systems for which technical and coordination competencies are required
- district/school-level leaders responsible for technology integration into teaching and learning for which integration and standards-based learning competencies required.

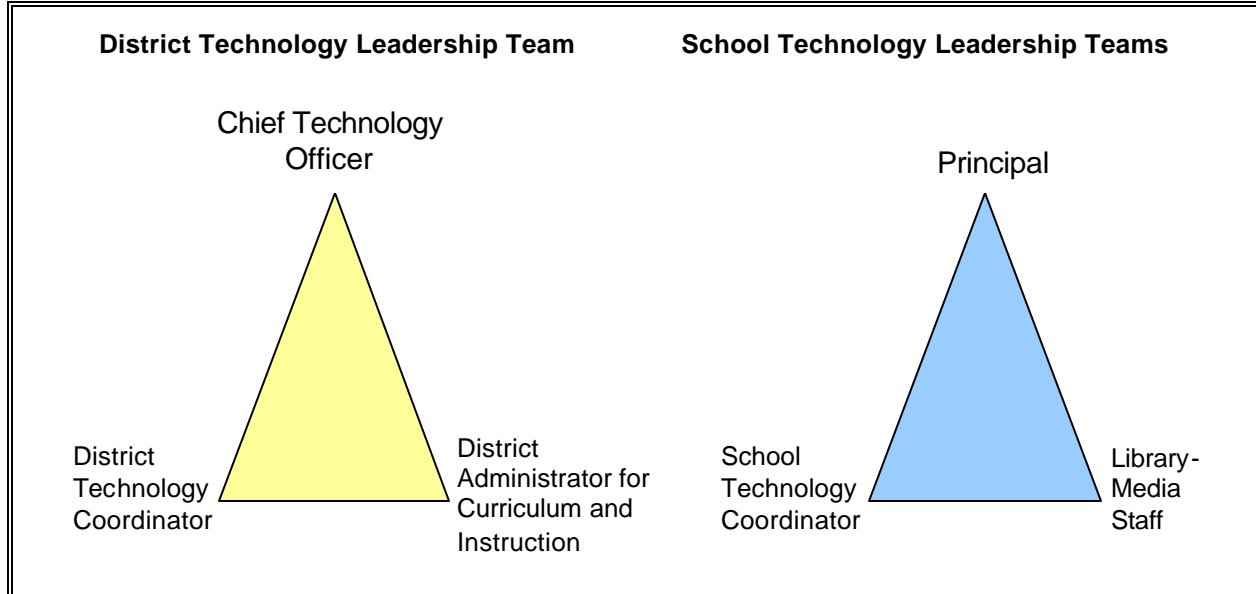


Figure 7-2

As each school establishes its technology leadership team it is important to develop strategies to provide the team with ongoing training and support, for example:

- function-related, competency-based job descriptions
- training in the related technical, integration, and leadership competencies
- online resources such as, frequently-asked questions (FAQs), technology standards for hardware and software, procurement information, trouble shooting and routine maintenance guidelines, electronic user guides, etc.
- regularly scheduled meetings to share information and address common issues
- ongoing sharing of information through e-mail, listservs, online discussion groups

Student technology leadership programs can be used to supplement school-based support. Students who have A+ Certification and have participated in the CISCO Academy are examples of the type of individuals that can be incorporated into a student technology leadership program. Even middle school students with training and supervision can become technology resources for teachers and their peers. Students already provide help with simple troubleshooting and routine maintenance tasks in many schools. This helping role can become more formalized, supervised and recognized in PSD. There are national models that can be selected and piloted. The pilot results need to be evaluated and the program(s) that best meet PSD needs could then be widely disseminated. Student technology leadership programs must be monitored and supervised to insure high quality.

Organizational Development

It will be essential that the Technology Department be expanded over time to respond to the growing support needs of users. In planning for future support needs it is helpful to consider functions within the four service domains. Examples of functions for each service domain are provided below:

- Learning Resources and Instructional Technology
 - Library-media management and services
 - Online circulation and delivery
 - Instruction and technology integration
 - Instructional applications
 - TV and multimedia
 - Distance learning and video conferencing
- Communications and Network Infrastructure
 - Business and financial systems
 - Student information system
 - Information processing tools/standards
 - Relational database management
 - Document storage and retrieval
- Information Management
 - Network management
 - Voice/video/data infrastructure
 - Internet access and security
 - Electronic communication (e-mail, fax, etc.)
 - Phone system
 - District website management

- Operations and Maintenance
 - Hardware and software maintenance
 - Technical standards and procurement
 - Installation and contract management
 - Fixed asset/capital asset management
 - Electronic project management
 - End-user relations and management
 - Research and planning

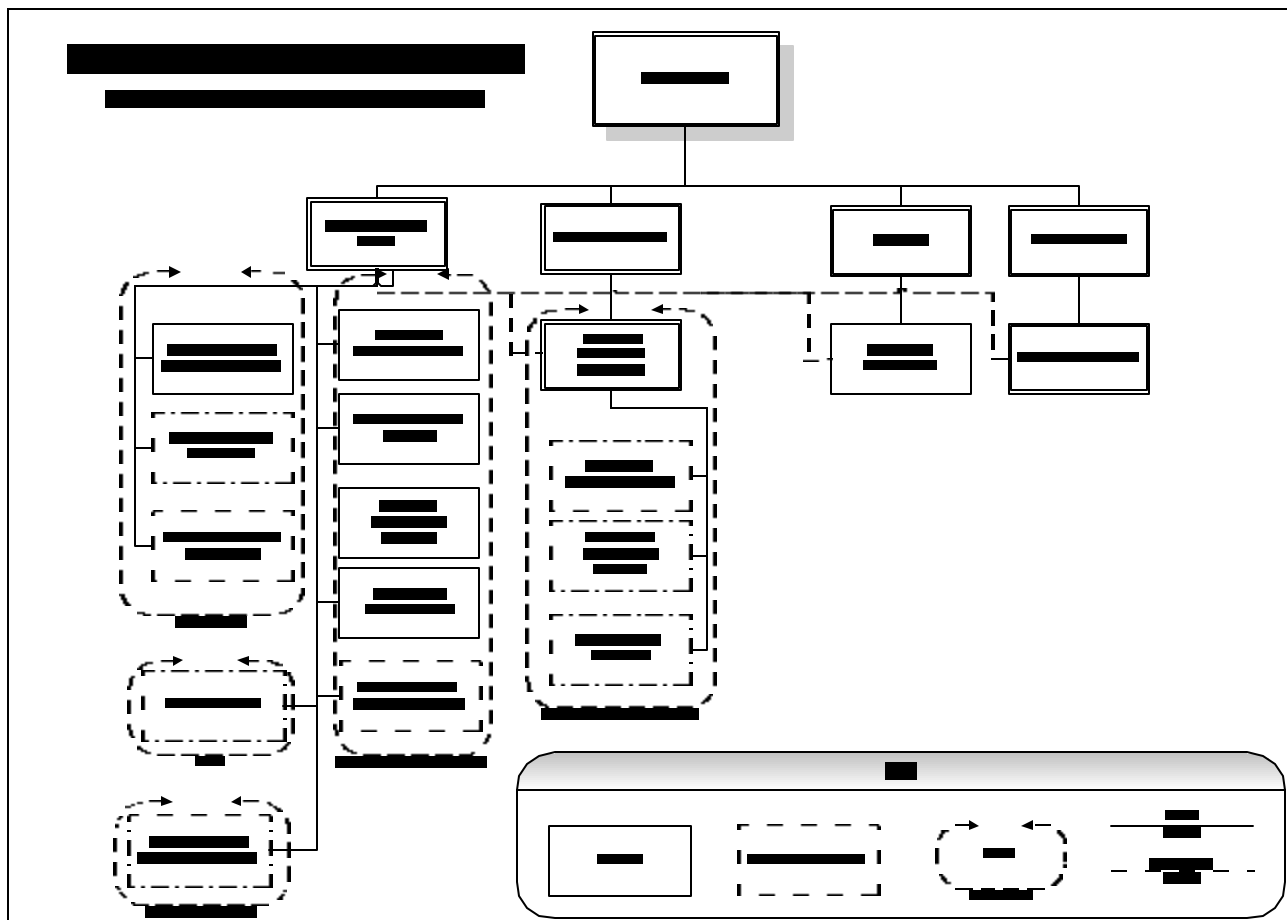
In each of the four service domains there is related staff development for users, technology support staff, and related Help Desk services. Clear guidelines and standards of service for district-provided, school-based, and outsourced technology support need to be established.

Appropriate staffing is necessary for ensuring that the equipment is reliably operational. The staff and students must have the ability to use the equipment. Some technology functions may be staffed on a one-time basis or can be filled by outside contracts. Other functions clearly require full-time ongoing positions. As this plan is implemented, it is perceived that the Providence School District will have requirements for the following positions:

- Chief Technology Officer
- Central Office Technology
 - Network Manager / City Hall Coordinator
 - Central Office Technology Support and Consultants
 - Field Support Specialists
 - Help Desk and PC Technicians
 - Other Contracted Services for Repair
 - Internal Professional Development
- REG 2000 Team
- Decision Support System (DSS) Team
- Educational Technology
 - Technical Services Expediter
 - Library Specialist
- Instructional Technology
 - Director of Instructional Technology
 - Technology Integration Mentors

- Professional Development Providers
- Monitoring and Evaluation
- Technology Coordinators

An organizational chart for these human resources follows:



Sample Job Responsibilities for each position in the Technology Organization Chart are offered in Appendix F.

To guide the recruitment and ongoing training of district and school-based technology support staff, the previously mentioned competency-based job descriptions should be developed. The Sample Job Responsibilities can be a useful resource for this task. After the major functions of district and school technology staff are clarified, technology competencies can be identified that align with these functions.

8.0 Technology Standards, Policies, and Procurement

Unless guided by architectural principles, designers in an autonomous environment will create chaos. The larger the environment grows, the more chaotic it gets.

-W. H. Inmon

An operating assumption for all policies, activities, and planning efforts is that all students can and will be enabled to achieve at high levels. In order to accomplish this, the District needs not only continue to set common standards and expectations, but must ensure classrooms are equipped with equitable reliable resources and that teachers have access to effective training strategies to enable students to reach those standards and expectations.

The topics addressed within this section are:

- Technology Standards
- Technology Policies
- Procurement Guidelines

8.1 Rationale

Technology specifications and procurement procedures are necessary to realize economies of scale, efficiencies of human resource development, and the establishment of an effective customer support systems. To ensure that technology has the desired impact on teaching and learning, the school district must establish processes for developing standards and consistently communicating those standards to the schools and divisions. Networks and equipment must be maintained and fully operative in order to support the expectations of students, teachers, and administrators.

8.2 Major Findings

Technology Standards

Although the Providence School District has recently standardized on Dell and Compaq computer workstations through centralized purchasing, the District does not have formal District-wide technology equipment and software standards in place for instructional or administrative use. Further, no process exists to create, update or maintain technology standards for District-wide use. Clear policies about installing and inventorying the education computing equipment have not been established. Often when new schools are built and/or established new technology is included.

Until recently, independent site-based management decisions determined what technology resources were acquired. There is no effective universal mechanism for communication of technology standards that are proposed or exist. The Chief Technology Officer has provided centralized purchasing technology standards to help guide the procurement efforts.

Schools that are familiar with site-based management decisions are not yet familiar with centralized procurement guidelines. There are no standards, policies or District-wide guidance for the purchase and use of educational software, and schools make their own decision as to which educational software they wish to purchase. A wide variance of educational software programs were observed during school-level site visits. The priorities of principals and school leadership teams are a significant factor in technology acquisition. Those schools where technology is seen as integral to addressing academic achievement goals are more likely to allocate resources to technology.

Many schools are proactive in obtaining funds to buy computers but several schools choose not to use their resources to raise money for items that are considered to be a District funding responsibility. There are inequities in the amount and quality of technology resources in the schools.

The District has no effective means to monitor compliance with standards. Individual schools purchase non-standard workstations, software, network wiring and other computing resources. There is a wide range of non-standard equipment in the schools and many versions of standard and non-standard software.

PSD staff have expressed a desire for a District-level policy to establish a basic level of technology to be provided at each school that aligns with guidelines for critical mass (i.e., student-to-computer ratio of 5:1). Clear criteria do not exist for what is District-wide policy vs. site-based policy in regard to instructional technology.

Technology Policies

Schools vary in their procedures governing student access to computers in libraries, labs, classrooms during free periods, lunch, after school, and when school is in session. Some schools encourage access and use; other schools have difficulty increasing access due to supervision or security issues. The decisions regarding the location of computers within the school may adversely affect student access and use.

Obstacles to equitable access within and among schools have been identified as (a) lack of availability or access to quality equipment, (b) variance in availability of funding sources, (c) priorities of site leadership, and (d) lack of technology-related staff development. Some programs and schools populations have funding opportunities that are not available to other schools.

Library/media staff and teachers have been concerned with Internet filtering and other issues regarding student access to inappropriate web content. The District does not have an officially adopted Acceptable Use Policy (AUP) in place, but is in

the process of researching and developing one. Currently internet filtering is the responsibility of RINET (the primary Internet provider from the Rhode Island State Department of Education). Currently, there is no formal District-wide policy about Internet filtering.

There are no well-defined methodologies or organizational structures in place for establishing and enforcing technology-related policies and procedures throughout the District. Clear criteria do not exist for what is core District policy and what is site-based policy in regard to instructional technology.

PSD does not have a formal shared policy regarding the installation, upgrading, maintenance, and phasing out of computer resources. Some school staff members claim not to be informed when changes occur at Central Office that affect their local network infrastructure. With the absence of clear and detailed policy and procedures, principals procure needed technology resources on an ad-hoc basis.

Many school personnel are not fully aware of acceptable procedures for procuring and maintaining technology resources. School personnel remain uncertain regarding official technology policies and procedural guidelines.

Procurement Guidelines

Among Providence's successes in the area of instructional technology has been the District's ability to successfully secure grant awards. Title 1, Title 2, Carl Perkins Grant, TLCF, Federal Challenge Grant, E-rate, private foundation grants and parent organization funds have all been available to advance the integration of technology into Providence classrooms. The District has been the recipient of an eight million dollar Carnegie Small Schools five-year grant to create smaller, theme oriented high schools as a model for Providence's 10 high schools. The grant is paying for planning, community outreach and Professional Development. At least one of the schools has been chosen to have a technology theme.

The District has been the recipient of a Gates Foundation Grant for literacy and numeracy. Each school will get an allocation of funds to decide how the dollars are to be used within the grant parameters of administrative guidelines. Although some of the schools have plans for the funds, there was not a District direction on how the funds should be utilized and some of principals interviewed were not able to identify how the funds may be allocated most effectively for their school.

Each individual school budgets for their own educational computing equipment purchases. Central Office has standardized on Dell and Compaq computers with specific configurations and all purchases are placed by Central Office and shipped directly to the individual schools. The procurement process is dependent on hard copy-forms and there is no on line procurement process. Administrators have expressed an interest in an automated forms management system with templates that could be forwarded to the various departments for approval. Administrators have expressed interest in leasing programs that can rapidly increase the number of technology resources while spreading costs over time.

School personnel remain uncertain regarding official technology policies and procedural guidelines. With the absence of clear and detailed policy and procedures, principals are free to make their own decisions regarding procurement of technology resources.

Across schools, there are differing opinions regarding the value of technology for teaching and learning. PSD does not have a system in place to inventory school-based technology resources. There is no system in place to assess the impact of technology applications on teaching and learning.

The Chief Technology Officer has recently begun a process of advising principals who are sometimes in the position of making key decisions in regard to technology acquisition without appropriate and timely resources to guide their decision making. Schools need help in determining that software will be compatible with hardware and is suitable to teaching and learning needs. Technology procurement practices typically do not incorporate an effective system for checking against recommended standards for equipment, software, and other resources. With the exception of computer purchases, there is no system in place that allows PSD to aggregate technology purchases across schools in order to take advantage of quantity discounts or promotional specials.

8.3 Major Initiatives

Technology Standards

- Establish a Technology Standards and Policies Committee and adopt a process for periodically reviewing and setting standards for all major technology components including workstations, peripherals, networks, and system software.
- Procure and upgrade computing equipment for classrooms and other learning environments in accordance with established standards, allocation programs, and critical mass guidelines.
- Set clear policy regarding compliance with technology standards and establish a system for monitoring enforcement.

Technology Policies

- Encourage policies and procedures at the school level for increasing student access to computers in libraries, labs and classrooms throughout the school day and after school hours.
- Continue to research, develop and implement District-wide strategies regarding Internet filtering and acceptable use policies.
- Develop clear policies, standards of service, and procedural guidelines regarding installation of new instructional technology equipment, upgrading and maintenance of older equipment, and phasing out of obsolete equipment.

- Develop and implement communications policies and procedures for the flow of information among District office, schools, administrators, teachers and parents.

Procurement Guidelines

- Continue to channel federal, state, and local grants and entitlements into technology resources and initiatives that address the District's instructional priorities.
- Establish a system to monitor and enforce compliance with technology procurement guidelines.
- Establish consistent communication systems to inform school personnel regarding all technology procurement procedures and guidelines.
- Develop inventory and tracking systems to enable monitoring of the deployment, use, and impact of technology resources.
- Ensure adherence to standards by assigning to each school someone knowledgeable about technology that can support people during the purchasing process to enable appropriate purchases compliant with standards.

8.4 Implementation Approaches

Technology Standards

The Providence School District should form a Technology Standards and Policies Committee and create a technology standards development process that:

- includes activities that communicate to all stakeholders the need and benefits for standardization within parameters
- allows for participation through representation by all user groups
- addresses periodic revisions that are necessitated by technology market advances
- may involve vendor representatives.

The Technology Standards and Policies Committee should define and periodically update standards for network and workstation hardware, software, and upgrades that address both technical capability and minimum capacity of equipment at classroom and building levels to help ensure equity of access across schools and to facilitate training and support. Also PSD should assign the function of oversight of technology standards and policies to a specific person or role within the organization.

Another role for the Technology Standards and Policies Committee should be to establish a student-to-computer critical mass standard for each level (elementary, middle, and high school). Nationally, many school districts have elected to target a students/computers ratio of 5:1 or better.

District leaders should develop a master procurement schedule and equipment allocation program for the District in order to move toward an equitable distribution of technology resources throughout the District over time. Further, Providence should establish a District policy for the equitable distribution of technology resources and communicate that policy to parents and school staff. It is expected that increasing the amount of communication to the public about technology plans and policies would improve community relations.

Ongoing communication is essential to maintaining standards. The District needs to develop and communicate clear District-wide technology policies and provide guidance to school personnel on technology implementation issues. District leaders should publish technology standards and policies on the web site and e-mail school decision-makers to notify them of updates and changes.

To gather input to refining standards and procurement procedures, the District should define a benchmarking process that allows vendors to qualify specific products against District standards, where applicable.

Technology Policies

PSD should provide funding, at the District level, for increased opportunities for student access to computers throughout the school day and beyond. Technology should become a regular line item in both central office and individual school budgets. District-level policy would encourage school-based efforts to increase student access to technology resources.

The District could develop a rubric that describes various levels of technology deployment in the schools. Schools could then self-assess their status regarding technology critical mass and access through the use of the rubric, and communicate results throughout the District. A sample rubric for schools is offered in Appendix E, School-based Assessment Rubric.

While adherence to standards should be generally maintained, there may be reasons to allow the purchase and use of non-standard technology resources such as a unique or specialized learning application. Therefore, PSD should build a policy into the process that allows waivers to standards in defined situations that warrant variation, such as specific teaching situations, ongoing successful practices, and support of new technology pilots.

Internet filtering remains a requirement for E-Rate funding. Currently, RINET provides Internet filtering services to PSD. The District should identify current Internet filtering and acceptable use policies used in schools throughout PSD. Current practice should be considered regarding the formation of filtering and acceptable policy. Once the new WAN is installed, a standard strategy for Internet



filtering must be developed for various grade levels within the Providence School District. The filtering process and acceptable use policies must be effectively communicated to all students, staff, and the school community.

Since there is currently a wide range of computer equipment in Providence schools, the District needs to define a life cycle and upgrade paths for various equipment to avoid obsolescence. Obsolescence for instructional computers and peripherals should be defined. Further, the District should provide guidelines for re-purposing and discarding older and obsolete equipment.

To enhance communications, use e-mail to inform school staff about WAN services and changes in requirements. Providence should develop a Listserv to provide policy, standards, and procedural information for school-level technology support staff. District leaders can maintain real-time updates of technology standards, policies, and procurement procedures on the Providence School District website.

Procurement Guidelines

Providence should strive to maintain their effective grants program to augment regular district funding for technology. The District should develop and disseminate a menu of all federal, state, and local grants and entitlements for technology resources and initiatives that are available at school and District levels. In order to encourage school staff to tap all available funding sources in support of technology initiatives the District should:

- identify strategies for finding and applying for "special audience" grants.
- identify individuals/agencies with the skills to develop competitive grant applications.
- conduct workshops/seminars on successful grant development.
- check web sites for grant opportunities.

While computer purchasing has recently been centralized, the District should further develop procurement procedures and keep school personnel up-to-date on guidelines. Technology procurement guidelines should be revised to enable efficient and effective monitoring of school-level compliance with published standards. Technology standards and procurement guidelines should be disseminated to vendors and provide briefings to encourage cooperation. The District should maintain real-time updates of technology standards, policies, and procurement procedures on the PSD website.

Tracking the deployment of technology resources across Providence schools will be necessary in order to address equity of opportunity and access to technology. Consequently, Providence should consider procurement and implementation of an application for inventory of technology resources. School staff will need to provide accurate and timely inventory information to the Central office. The District needs to provide technical assistance to schools in complying with inventory requirements and updating the District database with their technology resources.

Often vendors provide volume discounts, special programs, or other purchasing incentives. The District should track purchases to take maximum advantage of volume discounts and promotional pricing programs. An e-mail “alert” system could be designed to make sure that schools are aware of special programs available from approved vendors. The District should coordinate with vendors to establish a system to periodically aggregate purchases across schools to take advantage of volume discounts and reduce costs at the school level.

Ongoing communications will support effective procurement practice. To enhance procurement the District should:

- train school-level staff on requirements for technology procurement
- provide timely updates of technology standards and policies
- publish and post on the website information about effective instructional software

9.0 District-, School-, and Program-level Planning

Begin with the end in mind.

—Steven Covey

Planning is a major tool for identifying school- and program-based needs and perceived strengths and challenges. The development of multi-year school improvement plans and program plans serves as a critical foundation that enables stakeholder teams to provide direction for educational initiatives. All school and program planning efforts need to be aligned with district-wide priorities and reforms.

The topics addressed within this section are:

- School-level Improvement Planning
- Program-level Planning

9.1 Rationale

As indicated in the Superintendent's framework for reforming Providence Schools, *Rekindling the Dream*, a priority of the District is to empower school improvement planning teams to develop site strategies to improve student performance.

9.2 Major Findings

School-level Improvement Planning

Providence one Plans (POP) are developed by teams in every school. The teams review student assessment data, but there is some frustration with the timeliness and accuracy of the data. Each POP is reviewed by Central Office staff and approved by the PSD Board of Education. District leaders are interested in providing support to help school teams improve the planning process. POPs do not routinely consider strategies to improve the availability and integration of technology resources, or how technology can be used to address their high priority needs.

Program-Level Planning

Approaches for program-level strategic and technology planning have not been widely implemented. There are currently no clearly defined components, processes, and tools to promote high quality program-level planning in support of

District standards, strategic goals and improvement priorities. Program-level strategic and technology planning approaches have not been uniformly established to guide the delivery of support services and/or the performance of their major functions.

9.3 Major Initiatives

Schoollevel Improvement Planning

- Review and assess the established criteria and processes for developing and reviewing Providence One Plans (POP).
- Implement POP enhancements such as, providing written feedback, building in flexibility for multi-year improvement initiatives, including professional development and technology resources into the model, and providing training and technical assistance to the school planning teams.
- Develop a web-based planning tool to facilitate the development, review and analysis of Providence One Plans district-wide.

Program-Level Planning

- Develop a program-level planning model to parallel elements of the school planning model and address technology integration to support programs and departments.
- Customize the web-based school planning tool to accommodate the needs of specific district programs or departments.

9.4 Implementation Approaches

The district provided a useful Providence One Plan model and template for school improvement. This existing school improvement planning model and template needs to be reviewed and refined. The enhanced model could also include these elements:

- flexibility to include multi-year initiatives
- identification of technology needs
- determination of how technology can support other POP initiatives
- district-level implementation support (in addition to funding)
- implementation monitoring and evaluation of the impact of POP initiatives

Program areas (i.e., Title I, Special Education, gifted/talented, guidance, adult education) should also be provided with a planning model and planning resources. Web-based school- and program-level planning tools can be developed for ease in communicating and upgrading. Web-based planning tools and templates also enable compilation of information at the district level.

When designing the enhanced web-based planning tools it is important to determine the plan data that will be needed to support district-wide decision making. For example, it would be useful to have data from every school and program/department on their high priority training and professional development needs. Having Providence One Plan input from schools on the implementation support they need from the district-level departments could be used as needs assessment data for the program/department –level plans.

Key school- and program- level planners should be given the necessary training and technical support to use the web-planning process effectively. It may be necessary to transition into web-enabled planning over a two-year period to allow planning teams' time and opportunity to learn and experiment with web-based tools and templates.



PSD will need to establish new evaluation criteria for the enhanced school- and program-level plans that reflect standards for these plans. It is important that the Central Office and School Board review process include the assigning of responsibility for providing evaluative feedback and remediation support for school and program planning efforts. This feedback and remediation support will be particularly important during the transition period.

10.0 Community Involvement

There is a tremendous amount of technology power going underutilized each day in schools across the land. After millions of dollars are invested in wonderful equipment, it sits unused for 16 hours each day. If we could rethink our utilization patterns, we could double the availability of the hardware, for students as well as the adults in the community.

—FNO – The Educational Technology Journal, December 1991

The success of any educational system is dependent upon the degree to which the community-at-large supports that system. Technology can provide better and more diverse vehicles and opportunities for parents, the business community, and higher education to see their schools' work-in-progress, and to view and study the information that they will use to hold the system accountable for results. Listening to what the community wants and expects from its schools and its children, and developing accountability tools to help the public assess the district's performance are keystones to any public engagement effort.

This section addresses:

- Home/School Connections
- Community Learning Programs
- Public Information and Awareness

10.1 Rationale

The Providence School District has a major goal of parental involvement at every level in the schools. This goal naturally includes leveraging services and support for technology-based community learning. Incorporating technology-based community learning programs into a school's repertoire of services and programs will better facilitate school and community linkages, and improve communication with the public. The expansion of partnerships among the PSD, the business community, and higher education can build human and material resources that contribute to the attainment of educational goals.

10.2 Major Findings

Home/School Connections

As stated in the Superintendent's framework for reforming Providence Schools, *Rekindling the Dream*, the District, has made it a priority goal to strengthen parent and public engagement. Home/school communications are implemented

mainly through print media, either as newsletters or newspaper announcements. A District website is available. It is reasonably robust, bilingual, and is an organized source for school district information. Some, but not all, schools have websites.

There is no voice mail system which would assist parents in communicating with schools, finding out information about their children, and learning about educational opportunities and resources. There is a strong interest in identifying effective ways to establish communications between school staff and parents. In general websites are of limited value as a communications media for parents because many families do not have a computer at home.

Community Learning Programs

There are pockets of success such as the Volunteers in Providence Schools (VIPS) cyber-café that provide greater access to computers for both students and parents. Instructional technology resources are typically not available to community members beyond the school day. Reasons include: (a) resources for security and supervision, (b) equipment not centralized, and (c) appropriate instructional applications not identified and available. Custodial costs also make parent and community use of facilities and technology resources a costly matter. However, there is ongoing interest at all levels for more school-community linkages.

Efforts to promote collaboration between schools and outside agencies are compromised by very limited technology resources. A need for improved family outreach to support early intervention programs has been identified. Some school leaders would like to see their schools become community resource centers and are building partnerships with groups and expanding opportunities for student and community access throughout the year. There is minimal coordination and publicizing of existing community learning programs, partnerships, and relationships.

Teachers estimate that less than 50% of the District's student population has access to a home computer or regular Internet access beyond the school day. No formal survey has been conducted to validate this finding. Ad hoc queries of students during site visits indicate that home computer availability may be higher than teachers perceive.

Public Information and Awareness

The Student Registration Center has a six-year implementation plan to improve the registration process for parents and students. The changes in the process were lauded by a number of administrators.

The PSD have goals related to student achievement, school safety, and family/community involvement. Yet, there is no clearly identified function for attending to the needs of at-risk students and families through collaborations

among the schools, service organizations, and support agencies. There is a need for communicating to the public, business community, and higher education the expectations and potential benefits of technology initiatives.

10.3 Major Initiatives

Home/School Connections

- Assign the function, roles, and responsibilities for the development and maintenance of websites for schools and programs.
- Increase parental involvement and communication using multiple strategies such as telephone, voice messaging, Internet, web posting, and e-mail.

Community Learning Programs

- Seek ways to increase the number of technology-based community learning programs.

Public Information and Awareness

- Continue to implement the Registration Center Plan and evaluate its success on an annual basis.
- Assign a major function and provide informational resources within the Providence School District that addresses the needs of students, families and the community.
- Develop a comprehensive public information and internal communications plan for technology-related information.

10.4 Implementation Approaches

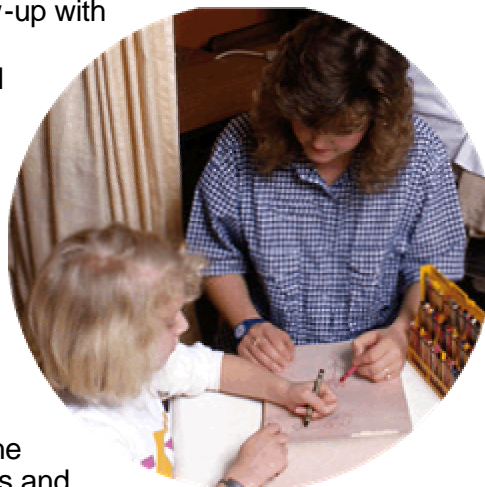
Home/School Connections

Critical staff to connect school with home includes nurses, counselors, psychologists, speech-language-hearing therapists, occupational and physical therapists, and other support staff who may actually serve several schools. Information must be made available to these staff members on a timely and daily basis. The capability of sharing data and information with health and service organizations, courts, and city and state agencies is a crucial component in the development of a responsive network infrastructure. However, identification, selection, and prioritization of that data and information must be accomplished within the framework of a comprehensive student database. To accomplish these goals, staff must have easy and daily access to hardware, software, training, and technical support.

To achieve district goals, technology needs to assist schools in helping students and their families secure the services from health and social service agencies. Technology should support the establishment and follow-up of these health and social service agency linkages, as well as, provide each school with the capacity to build on existing family support and education programs. Technology will also play a critical role in providing ongoing up-to-date information and referral within the school community, and in reporting unmet needs, services used, and results achieved. Facilitating these partnerships could put an end to the isolation of many of the schools that do not currently have easy access to these services.

Technology will also play a major role in school safety by providing to appropriate users an overview of offenses and approved corrective action, and improving cooperation and understanding among students, teachers, nurses, and community liaisons. It will also facilitate follow-up with families in the community and home visits. Additionally, new data collection strategies will assist security personnel in predicting potential problems as well as in providing performance indicators.

Ongoing communication between school and the community or home needs to be nurtured through a variety of technology-based activities and processes. These activities and processes will enhance school-community relations and, at the same time, develop support for the use of technology in the schools. These technology-supported activities and processes could include the following initiatives:



- To introduce a school voice-mail systems to provide additional opportunities for communication between home and school. Ideally, homework assignments and calendar events could be posted in a central announcements mailbox. These systems will also allow parents to leave messages for individual teachers.
- To assign the function and responsibility for the development and maintenance of Web sites for schools and programs. Provide ongoing technical assistance in maintaining school Web sites.
- To increase access to hardware, software, the Internet, and training to address and facilitate parent and community needs, partnerships, and linkages with city and state agencies.

Community Learning Programs

The outcomes of sharing with the community the District's educational, business, and technology resources will prove to be an enormous benefit to all involved. Access to schools' technology resources in the form of community learning programs will increase technology literacy within the greater community as well as provide greater cost effectiveness of schools' technology expenditures. To

this end, an organizational unit for community education, separate from adult education, should be created to seek ways to increase the number of technology-based, community-learning programs available to the public.

Most importantly, the availability of technology in schools, after school hours, can be utilized to improved literacy skills among the adult population. Many instructional software resources are available, designed specifically for adults that can improve reading, writing, listening, and communication skills. The Community Education unit would include as major functions:

- identification of appropriate technology resources in schools
- acquisition and licensing of software that research indicates to be effective for improving adult literacy
- development of program funding sources
- collaboration with and among adult literacy providers
- staffing and security for programs

A committee of staff and parent representatives from schools with model technology community-learning programs could help support other schools in developing a parent volunteer program. Parents with technology skills and those who are willing to be trained can be recruited to volunteer in computer labs, libraries or in classrooms. These volunteers will also be able to upgrade their technology skills as they coach participants. It will be important to develop a set of district-wide guidelines or policies for community-learning programs to facilitate access and insure security for technology facilities after school and during the summer. Community-learning programs should also draw upon the experiences and expertise of exemplary national, regional, and local technology-based programs. Schools will need district guidance, resources, training and technical support in designing and implementing technology-based community learning programs.

Public Information and Awareness

A district public information and awareness plan is needed to garner support of the *Technology Plan*. The purpose of the plan will be to assist parents and community leaders in better understanding how technology can be used in the schools. In addition, strategies will be developed to create opportunities for ongoing communication with the members of the community regarding school technology issues. Technology should be used as a tool for implementing the plan.

To support these efforts databases will be needed to allow the district to collect and analyze survey data so that staff can better understand the needs of the schools' constituents. Communication technology enables the schools to reach more people more often. Through new accountability tools that use technology, schools can ensure that the public is aware of the district's performance and has the information to hold the schools accountable.

Technology-based community-learning programs provide the opportunity to develop and sustain community-wide support for technology while at the same time increasing parent, family, and community technology literacy. As schools pursue joint organizational relationships, there will be opportunities for schools to be open during off-hours. This time could be used for jointly agreed-upon adult education classes and programs aimed at promoting the technological fluency of parents. Such classes might include weekend programs, summer programs, courses for credit, and enrichment programs. School Improvement Councils could also provide input to a district-wide public information plan.

The District needs to continue building its Web presence so that parents and community members can increasingly retrieve information about the PSD. Eventually, parents will be able to view their children's progress and then communicate directly with teachers from either their home, local library, and/or community center/organization. Communication with the public means reaching out to many different audiences. The diversity of socio-economic groups and languages makes it imperative to create a number of mechanisms to ensure that all groups are reached.

A public awareness campaign should include multiple outreach strategies, such as:

- Use of a various media to disseminate the vision and goals articulated in the *Technology Plan* to homes, businesses, community agencies, and higher education institutions.
- Support of the Mayor's Office and Municipal Council members to act as advocates for the technology plan.
- Citywide and local public forums for community, business, community agencies, and higher education leaders to garner support for the vision, goals, and implementation strategies of the *Technology Plan*.

Section 3:
IMPLEMENTATION RESOURCES

1.0 Monitoring and Evaluation Design

Two forces are bringing these worlds together: The accountability world is moving from monitoring processes to monitoring results. The evaluation world is being demystified, its techniques becoming more collaborative, its applicability broadened, and its data no longer closely held as if by a hostile, foreign power.

—Lisabeth Schorr, *Common Purpose: Strengthening Families and Neighborhoods to Rebuild America*

A major benefit of planning is that it serves as a learning catalyst. As strategic plans such as the *Technology Plan* are put into place, the Providence School District (PSD) must strive to monitor, evaluate, and revise its plans for maximum effectiveness. Strategies to be included in this reflective process consist of ongoing data collection regarding selected performance measures, timely communication of data and analyses to key decision makers, and periodic reports that address both implementation and impact assessment. This section of the plans deals with:

- Plan Monitoring Approaches
- Plan Evaluation Approaches
- Monitoring/Evaluating the *Technology Plan*

If planning is a catalyst for learning, then the *Instructional Technology Plan* must incorporate processes, structures, and tools for monitoring the implementation of the plan and evaluating its impact in terms of quality and effectiveness. Simultaneously, plan monitoring and evaluation must support PSD in thinking and behaving strategically and systemically. To accomplish this work PSD needs to create a system addressed to both monitoring of key tasks, activities, and milestones as well as to judging the quality, effectiveness, and efficiency of the educational technology system. The system would require ongoing data collection regarding selected performance measures, timely communication of data and analyses to key decision makers, and periodic reports that address both implementation progress and impact assessment. The system should include an assignment of responsibilities, timely monitoring of all major implementation tasks and activities, ongoing communication, and adherence to a plan-do-plan-do cycle.



The system for monitoring and evaluation should include four essential components:

- **Strategic results.** Processes and structures for clarifying and selecting key results, usually stated as performance outcomes.
- **Indicators and measures.** Processes and structures for identifying variables and performance measures for strategic results.

- **Data collection and analysis.** Processes and structures for collecting and aggregating data and preparing and presenting useful analyses.
- **Dissemination and utilization.** Processes and structures for timely communication of analyses and facilitating their use by key decision makers at school, local district, and District levels.

1.1 Plan Monitoring Approaches

Typically, implementation monitoring is focused on the execution of plan initiatives. The purpose of implementation monitoring is to provide real-time information. Implementation monitoring requires systems for watching and adjusting in a real-time mode to maintain compliance with the plan and to guide decisions regarding adjustments. PSD decision-makers need to track important data and communicate that data effectively to a variety of stakeholders.

Implementation monitoring strategies address questions such as:

- Were tasks completed as designed? Were implementation timelines met? If not, why?
- What barriers were encountered during implementation? How were they addressed?
- What adjustments were made in key tasks and activities? Why? To what effect?
- What are the implications of these mid-course corrections for improving or redesigning the plan?

Key system components related to monitoring plan implementation are:

- **Identification of Tasks, Deliverables, and Timelines.** Each major initiative or program should include a delineation of tasks and timelines.
- **Discrepancy Analysis.** Each project evaluator should undertake a discrepancy analysis of expected versus actual implementation schedules.
- **Information Systems.** The use of project management software would allow PSD to employ continuous feedback systems to monitor time lines, key events, and measures of cost and productivity. Such software, and related databases, can document, capture, and make information widely accessible on the myriad of small, immediate adjustments occurring during implementation.
- **Communication.** Processes, structures, and tools need to be established for uniform communication regarding adherence to timelines and related deliverable specifications.
- **Decision-making Structures.** Processes and structures need to be established for informing decisions about mid-course corrections and possible redesign of project/program initiatives. Maintain all monitoring information in a database, accessible by key decision-makers during the monitoring cycle.

1.2 Plan Evaluation Approaches

While implementation monitoring is important at the state and district levels, particular emphasis needs to be given to evaluating the impact of the *Technology Plan*, particularly as the plan increases its emphasis on technology integration into teaching and learning and administration and management. The purpose of the evaluation component of a comprehensive system is to provide ongoing information on impact.

Evaluation strategies address questions such as:

- How is technology contributing to Districts' core capacities for strategic educational improvement?
- How is technology contributing to improved student learning?
- How is technology contributing to improve organizational learning?

PSD should take these action steps to develop the evaluation components of the system:

- **Identify specific strategies based on selected instructional technology goals.** Using PSD' updated instructional technology goals, strategies for selected goals to be evaluated need to be chosen. Not all strategies can be assessed due to their number.
- **Identify, benchmarks, and measures for each strategy.** Related to each strategy will be benchmarks and measures. A benchmark is a specific target that provides a sense of what the strategy is trying to attain. Measures must also be determined. A measure is an item reflecting the evidence needed to answer a research question, inform an indicator, or to determine how close the organization is in achieving a benchmark. A measure typically includes data such as percentage, test scores, ratios, etc.
- **Assign responsibility for evaluating each strategy to the appropriate PSD staff or unit.** Evaluation should be embedded within the appropriate PSD program unit responsible for each strategy. The assessment process should be simultaneously top-down and bottom-up, gathering information from the operating system about what is happening in schools with respect to the strategies, what new or enhanced interventions are needed to obtain the results, and what new or unanticipated outcomes and results are being realized.
- **Select measures and methods.** Data gathering will require the use of uniform measures and methods for each strategy. If data is gathered from the field, the District will need to follow standards for assuring quality data collection and analysis.
- **Establish a database for tracking performance measures.** Such databases can be linked to Web-based tools for data entry and analysis. The system should employ databases, preferably electronic, for collecting, organizing, and disseminating data and information in diverse forms to serve multiple audiences. For example, the system would provide guidance in developing databases of best practices in several categories--teaching and learning, communications, administration, and management. These databases address what is working and why and what is not working and why. Databases can also be used to set up discussions on various instructional and administrative strategies; even chat

rooms among teachers and principals are very useful. The intent is to make information available to all using the District's telecommunications infrastructure as well as more traditional means of communication.

- **Develop analysis and reporting procedures and formats.** Detailed analytic reports and simple Web-based displays linked to key strategies and indicators should be used.
- **Identify key decision makers requiring specific data.** Decision makers must be targeted regarding their information needs and decision-making contexts. Prepare reports for technology leaders, District and local district leaders, schools, and the public.

Selecting appropriate variables and tracking relevant strategies pose serious challenges. While there is considerable pressure to judge the effectiveness of technology using student performance data, there is a concern with using one measure to judge effectiveness, particularly student performance as assessed by current measures. The system must use multiple indicators and measures in order to enhance the validity and reliability of such judgments.

Distilling out the unique contribution of educational technology in a complex intervention is a formidable task. Rather than attempt such a distillation at this early stage of technology integration, it might be more appropriate to document what is going on, particularly with respect to programs and practices that appear to be exemplary.

Technology innovations often change the whole learning environment, making it difficult to undertake analytical studies, particularly in schools. Education technology integration needs to be viewed as complex bundles of changes. It is unlikely that the District will have enough regression analysis tools to accomplish the distillation required for analytic work with respect to most of these variables. The District will implement a bundle of interventions when they introduce technology into teaching and learning. Thus, it needs to examine the interface between technology and the curriculum materials, content, pedagogy, professional development, assessment, and the learning environment.



In many instances it is premature to conduct analytic studies that attempt to isolate the unique contribution of the technology on student performance, particularly when measured by standardized tests. There is a need for balanced attention to analytic and systemic approaches.

Rather than attempting to distill out the unique contribution of technology to a specific initiative or even to a specific learning outcome, PSD should consider using more holistic, qualitative data in the form of rich descriptions of what is happening in classrooms with respect to technology-embedded learning opportunities. In many cases technology's real impact may be in areas that are not under the analytic spotlight. It will take a systemic approach to illuminate the issues and their interconnectedness. A system that collects rich/thick description may be more appropriate and is a task that practitioners may be able to perform most effectively. The challenge is to create simple systems for teachers that enable them to collect useful data on instructional practices that serve as measures of high learning performance.

The real impact of technology may be in areas receiving little district attention. Instead of asking, “Do computers work?” districts need to ask, “What specific applications, under what circumstances, appear to contribute most to increased student learning?” With such a system in place, the district can be more precise in addressing questions about the broad impact of education technology investments, as well as on more specific questions regarding specific outcomes. The District need rich description as well as quantitative data on a diverse set of variables, most often focused where the real impact may be—on the nature of the learning process itself. Decision-makers need to track important data and to communicate that data effectively to a variety of stakeholders.

PSD should consider these process steps in their assessment design:

- prioritize and determine appropriate plan outcomes
- identify indicators, benchmarks, and measures for each goal
- assign responsibility for each outcome assessment to the appropriate PSD staff or unit
- establish a database for tracking performance measures
- develop analysis and reporting procedures and formats
- identify key decision makers requiring specific indicator data

Communication Processes

An additional challenge is how to disseminate data to all those who need to know. A different approach is proposed that redefines the task as one of accountability rather than dissemination; that is, the District should assign data collection on indicators to those units or staff accountable for accomplishing the objectives related to those indicators. When specific staff members are accountable for certain outcomes, they will have a built-in self-interest in the scope and quality of the data they require. If this alignment of need and use is not established, communication becomes a problem of dissemination—convincing various people to access and analyze data they are not convinced they need.

It is important to recognize that long reports are not the only way to communicate results. PowerPoint presentations, informational meetings, and web pages are but a few alternative possibilities.

1.3 Plan Upgrade Strategies

The Technology and Curriculum divisions should establish a planning subcommittee that meets each spring to share and discuss results of monitoring and evaluation efforts. Any reporting documents or resources will be prepared. Based upon results to date, detailed plans for subsequent planning phases will be developed. Additional strategies will be added to the plan. The plan may be established and maintained as a web-based resource available for review on the District-wide web site at any time by all stakeholders.

2.0 Estimated Budget

2.1 Introduction

An estimated three-year budget for funding selected aspects of the *Technology Plan* has been developed based upon a set of assumptions for software, hardware, and support services. Major assumptions as developed are outlined below. These estimates are useful only for discussion and should not necessarily be used for decision making purposes.

In determining an accurate overall cost of the Technology program, the following process should be followed:

- accurately identify the population to be served
- establish technology target levels
- identify accurate standards and cost per unit for equipment that meets standards
- determine total needed
- deduct existing resources that meet standards
- calculate unmet need
- determine phase-in by year
- identify funding sources

Once the necessary costs are determined, the district should establish an on-going, annual commitment, as a line-item in the regular budget to support the technology infrastructure and resources in classrooms.

2.2 Budget Assumptions

Demographics

- The district serves approximately 27,300 K-12 students.
- There are approximately 2,147 staff members in PSD
- The 2002-03 budget presented by the Chief Technology Officer (CTO) was reviewed and included and supplemental additional budgetary suggestions are included
- A ratio of 5 to 1 student-to-computer ratio is included.
- One computer for every staff member is included.
- One laptop computer per building administrator is included.
- Adequate shared peripherals (scanners, printers, etc.) are included.
- Many of the costs in the budget are eligible to be subsidized through state, federal and competitive grants.

Software/Media

- \$250 per computer is allocated. This cost is based on average costs and assumes the use of site licenses, volume discounts and academic pricing where ever possible.
- Additional costs are assumed for purchasing, installing and implementing decision support, communications and administrative software and are budgeted separately.

Hardware

- The number of student workstations was calculated by taking the total student population (25,611) and determining a 5-to-1 ratio (5,122).
- Although the district has purchased some new computers and accurate inventory is not available, technology purchases are based on having a “fresh start.” The current equipment will be close to being replaced prior to the budget expiring in three years.
- The average cost of the academic computers is calculated to be \$1,115 each. This is based on the volume pricing the Director of Technology has negotiated with Dell Computers.
- An average of one and a half computer carts of 24 laptops at \$40,000 each has budgeted for each school. This is based on the volume pricing the CTO has negotiated with Dell Computers.
- The average cost of staff computers is also calculated to be \$1,115 each.
- The average cost of the administrative laptop computers is calculated to be \$2,300 each. This is based on the volume pricing the CTO has negotiated with Dell Computers.
- No inflation or deflation is assumed for the hardware. By maintaining the same price point for hardware, more powerful systems will be purchased in the future at the same price.

Network Infrastructure

- Network Infrastructure costs are based on PSD receiving a 90 % reimbursement from the e-rate program as outlined in the 2002-03 proposed budget.

Services

- The professional development budget was determined by calculating 15% of the total budget for student hardware. This is a CELT recommended standard. It represents approximately \$435 for each staff member for all 3 project phases or \$145 annually. This is a reasonable amount for a district the size of PSD. A portion of these funds may be available through the new ESEA – No Child Left Behind federal legislation.

2.3 Three-Year Budget

Table 2-1 below provides budget figures for purchasing, installing, and operating the proposed technology system for three years and percent implementation for each phase. The budget assumes implementation of provisions listed in the Blueprint.

Table 2-1: Three-Year Budget—Annual Expenditures and Implementation Phase-In

Total Students: 27,300

Total Teachers: 2,147

Total Schools: 44

	Total Phase I	Total Phase II	Total Phase III	3-Phase Total
Central Office				
Central Office General				
Salaries	60,000	63,000	66,150	189,150
Overtime	5,000	5,250	5,513	15,763
Tech Support Services	1,500	1,575	1,654	4,729
Consultants	75,000	78,750	82,688	236,438
Internal Team Professional Development	7,500	7,500	7,500	22,500
* ATM router	40,000	40,000	40,000	120,000
* New WAN Communications Equip. Installation	52,640	52,640	52,640	157,920
Central Office Hardware (Servers, laptop, etc.)	30,500	30,500	30,500	91,500
Repair of Central Office Equipment	50,000	50,000	50,000	150,000
Central Office Software & Licenses	200,000	200,000	200,000	600,000
Misc. (Travel, Subscriptions, supplies, etc.)	21,880	21,880	21,880	65,640
Subtotal	544,020	551,095	558,524	1,653,639
Data Processing				
Firm Solutions Contract (REG 2000)	392,000	392,000	392,000	1,176,000
REG 2000 Citrix Servers	66,500	66,500	66,500	199,500
Software and Licenses for REG 2000	57,408	57,408	57,408	172,224
Data Processing Repair Budget	31,000	31,000	31,000	93,000
Ed. Supplies, Report card stock, etc.	20,000	20,000	20,000	60,000
Office Supplies, Printing Etc.	3,000	3,000	3,000	9,000
High Speed T1 Lines	50,000	50,000	50,000	150,000
Subtotal	619,908	619,908	619,908	1,859,724

Central Office (continued)				
Educational Technology				
Staff				
Staff Training	5,500	5,775	6,064	17,339
Clerks, Library	30,000	31,500	33,075	94,575
Communications				
Installation of Communications Equipment	567,760	283,880	141,940	993,580
Equipment				
Contracted services for repair of equipment	98,000	98,000	98,000	294,000
Library Media equipment	13,500	13,500	13,500	40,500
Educational equipment	19,000	19,000	19,000	57,000
Educational supplies and maintenance	96,525	96,525	96,525	289,575
Misc. Other costs, (phone, postage, supplies)	5,276	5,276	5,276	15,828
Subtotal	835,561	553,456	413,380	1,802,397
Central Office Instructional Technology				
** Professional Development	309,395	309,395	309,395	928,185
Consultant for Curriculum Development	22,000	23,100	24,255	69,355
Lab equipment for Professional Development	49,900	10,000	10,000	69,900
Misc. (Travel, books, etc.)	19,414	19,414	19,414	58,242
Subtotal	400,709	361,909	363,064	1,125,682
Decision Support System				
*** Design, Development & Implementation Services	350,000	350,000	350,000	1,050,000
Building Level				
Hardware				
Student Hardware (1:5 over three years)	2,029,300	2,029,300	2,029,300	6,087,900
Student Mobile Labs (1.5 per school)	880,000	880,000	880,000	2,640,000
Administrative Staff (Laptops w/ docking)	33,733	33,733	33,733	101,200
Support Staff	32,707	32,707	32,707	98,120
Instructional Staff Workstations	797,968	797,968	797,968	2,393,905
Printers - classroom	152,533	152,533	152,533	457,600
Printers - Color Laser	64,533	64,533	64,533	193,600
Scanners, Cameras, projectors, etc.	146,667	146,667	146,667	440,000
Subtotal	1,194,408	1,194,408	1,194,408	3,583,225
File Servers				
Media/instructional	58,667	58,667	58,667	176,000
Administrative/curriculum	58,667	58,667	58,667	176,000
Communications	58,667	58,667	58,667	176,000
Subtotal	176,000	176,000	176,000	528,000

Building Level (continued)				
Telephone and Voice Messaging	146,667	146,667	146,667	440,000
Software / Media				
**** Instructional Software to support the curriculum	765,917	765,917	765,917	2,297,750
Grand Total	5,033,190	4,719,360	4,587,867	14,340,417

Average Annual Cost Per Student	\$ 146
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- * potential for e-rate funding
- ** potential for state, federal grants
- *** may be included in curriculum resource budgets
- **** possible inclusion in state decision support project

This budget intentionally does not mandate specific configurations of equipment. It is expected that schools will choose a range of power and capabilities for its classrooms, teachers, and administrators. Further, decisions regarding deployment, location, and distribution should remain school-based. As a result, when cost is identified in the estimated budget, it is an average expected cost. For example, some workstations may cost more than the average while others will cost less. The cost estimates are based on average current prices for recent volume purchase contracts of large school districts.

Figure 2-1 offers an analysis of proportionate costs for developing and operating PSD's technology system based on the proposed budget found in Table 1.

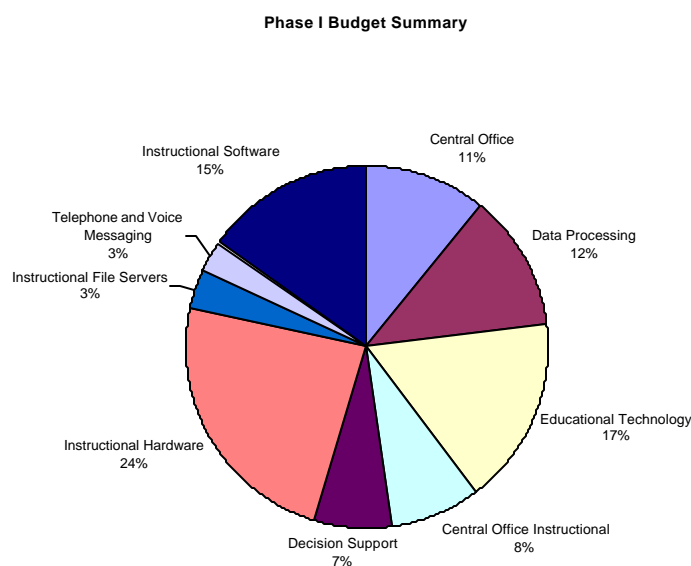


Figure 2-1: Funding Pattern

2.4 Funding Sources

The costs for improved technology are significant. Although the budget estimate total is large, one must remember that it is a three-year budget and that PSD already spends a considerable amount on technology annually that can be directed in support of the plan. Creative funding strategies are needed, including reallocation of existing resources. Federal, state, and local sources of funding can be combined to offset some of the expected costs. Districts have numerous potential funding programs including those described below:

2.1.1 Federal Funding Sources

More and more federal agencies are becoming involved in the support of education. Given the enormity and complexity of the federal involvement in education, any effective accessing plan must involve several players connecting with several agencies and programs. Multiple-year, informed, systematic, and continuous communication with the most promising agencies is essential.

Department of Education Information Online provides World Wide Web sites with numerous funding opportunities for individuals with Internet access, <http://www.ed.gov> or call (202) 708-7774. Some Department of Education programs currently available under the ESEA (No Child Left Behind Elementary and Secondary Education Act) are:

- Title I Funds: Grants for Disadvantaged Students (formerly Chapter 1)
- Carl D. Perkins Vocational and Applied Technology Funds
- Public Library Construction and Technology Enhancement
- 21st Century Community Learning Centers
- Improving Teacher Quality State Grants
- Educational Technology State Grants
- Rural and Low Income Schools Program
- Language Acquisition State Grants

National Science Foundation (NSF) puts all its publications, press releases and announcements on-line with system software called TOPIC that makes it easy to find grant information. Gopher to stis.nsf.gov/ and logon as "public" if necessary, visit their web site <http://www.nsf.gov>, or call (703) 306-1234. NSF programs include:

- The Applications of Advanced Technology Program
- The Teacher Enhancement Program (TEP)
- The Networking Infrastructure for Education Program (NIE)

Department of Labor---Office of Job Training Programs administers the Job Training Partnership Act (JTPA) with individual grants awarded by state education agencies. This program for vocational education programs provides funds that may be used to purchase technology resources.

Department of Commerce disseminates technical information, services, and products through the National Technical Information Service, (703) 487-4600. The National Telecommunication and Information Administration (NTIA) has three grant opportunities to offer K-12 schools. To contact the NTIA call (202) 482-5802 or visit <http://www.ntia.doc.gov/www/otiahome>.

- The National Telecommunications and Information Infrastructure Application Program (TIIAP)
- The Public Telecommunications Facilities Program (PTFP)
- The National Endowment for Children's Educational Television (NECET)

Department of Energy also provides a range of services for schools including equipment loans and donation programs. They can be contacted at (202) 586-8949 or visit <http://www.doe.gov>.

National Endowment for the Humanities (NEH) offers a number of projects and including Teaching with Technology. For more information call (800) 606-8400 or visit <http://www.neh.fed.us>.

Federal Communication Commission (FCC) offers one of the most significant sources of funding for school telecommunications infrastructure through the Universal Service Fund (USF) for schools and libraries established by the Telecommunications Act of 1996. The Act called for telecommunications deregulation, cross industry competition, and the creation of a universal service fund to subsidize service for rural and high-cost areas, K-12 schools, and libraries. Approximately \$1.3 billion will be available in FY00-01 for school and library telecommunications infrastructure.

Under the program, PSD has received and will continue to receive discounts, pending timely application and continued eligibility, on certain products and services, including:

- any commercially available telecommunications service
- internal connections, including installation and basic maintenance
 - hubs, switches, and routers
 - communications servers
 - network wiring or wireless local-area networks
- access to the Internet

The FCC requires that schools and libraries have an approved technology plan and that they seek competitive bids for all eligible services. Price should be the primary factor in selecting a bid; however the FCC does not require award to the lowest bidder. The universal service funds will be paid directly to the providers. Current USF information can be found at www.fcc.gov/learnnet and www.ala.org/oitp/uniserv.html.

2.1.2 Other Resources

In addition, there are numerous private foundations and trusts interested in supporting school technology projects. Donations may be sought from businesses, industries, and parents.

The educational community is just beginning to tap the wealth of resources available to schools through partnerships with community groups, local businesses, municipal agencies, and higher education. Partners can share resources and staff development, offer expertise, match financial contributions, provide volunteers, create apprenticeships, and locate equipment donations for hardware, software, and infrastructure. With increased state-of-the-art technology resources in the schools, it may be easier to form partnerships with business and community organizations that will underwrite some costs by paying user fees for use of the resources after school hours.

Some major web-sites for researching available funding sources for technology in schools are offered below:

Federal Funding

<http://www.ed.gov/Technology/tec-guid.html>

<http://polarisgrantscentral.net/federalsources.htm>

Foundation Sources

<http://polarisgrantscentral.net/foundationsources.htm>

Other Sources

<http://sra.rams.com/vws/sra/resource.htm>

<http://polarisgrantscentral.net/>

3.0 Action Plan

Strategies	Year 1-2	Year 3	Year 4	Goals Addressed*	Responsibility Level**
Curriculum and Assessment					
Student Technology Standards					
1. Develop a set of K-12 student technology standards, differentiated by grade level.				1	IN, TF
Curriculum and Technology Integration					
2. Identify and adopt strategies, processes and structures for systematically integrating technology into the curriculum.				1	IN
3. Identify and expand successful curriculum/technology integration practices currently in Providence Schools.				1	O, IN
4. Employ technology enhanced strategies where appropriate to support instruction for the bilingual population and their families.				1, 2	O, IN, SB
Assessment					
5. Implement a comprehensive assessment system that is easy-to-use, composed of multiple indicators, and provides teachers and administrators with information about student mastery of learning standards to enable more targeted instruction and facilitate compliance with ESEA.					PSD
6. Adopt an evaluation framework for assessing the District's system-wide technology performance.				1, 2	PSD, IT

*** Goals Addressed:**

- 1 = Increasing student achievement through a consistent and comprehensive focus on teaching and learning.
- 2 = Creating capacity within the system to support and nurture a continuous learning environment focusing on student achievement.
- 3 = Strengthening parent and public engagement.

**** Responsibility:**

- SB = School-based
- IT = Technology Division
- IN = Instructional Technology Staff
- O = Specific Office
- PSD = Central
- TF = Task Force

Strategies	Year 1-2	Year 3	Year 4	Goals Addressed*	Responsibility Level**
Curriculum and Assessment					
Curriculum Development and Learning Management					
7. Identify the critical components for a decision support system that includes a web-based curriculum development and learning management system to link curricular, instructional resource, assessment, and student information.				1	PSD, O
8. Identify and implement strategies for providing teachers with current student information to help inform decision-making.				1, 2	IT

*** Goals Addressed:**

- 1 = Increasing student achievement through a consistent and comprehensive focus on teaching and learning.
- 2 = Creating capacity within the system to support and nurture a continuous learning environment focusing on student achievement.
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Strategies	Year 1-2	Year 3	Year 4	Goals Addressed*	Responsibility Level**
Learning Technologies					
Technology Utilization					
1. Develop strategies to integrate technology into the K-12 curriculum areas that include descriptions of appropriate technology enriched learning environments for various grade levels and subject areas.				2	IN, IT
2. Acquire and implement low-cost alternatives to desktop computing devices and resources that have proven successful in supporting curricular goals, improving literacy, and increasing student achievement on state assessments.				1	IN, IT, SB
Access and Equity					
3. Acquire instructional computers to attain a student-to-computer ratio of 5:1 with peripherals in accordance with a procurement and allocation schedule that addresses equity of access issues district-wide.				2	PSD, IT
4. Identify and promote a variety of technology supported solutions and strategies for students at-risk which provide interventions during and beyond the standard school day.				1, 2	IN, SB
5. Develop and implement strategies for providing student, family, and teacher access to technology during after school hours.				2, 3	IT, SB
6. Provide one multimedia computer to each teacher, or team of teachers, with readily accessible projection capability via data projector or large monitors in classrooms.				1, 2	IT, SB

*** Goals Addressed:**

- 1 = Increasing student achievement through a consistent and comprehensive focus on teaching and learning.
- 2 = Creating capacity within the system to support and nurture a continuous learning environment focusing on student achievement.
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Strategies	Year 1-2	Year 3	Year 4	Goals Addressed*	Responsibility Level**
Learning Technologies					
Instructional Applications					
7. At the District level, standardize on a core set of applications beyond the productivity suite that the District is able to support with professional development offerings and on-going integration/ implementation assistance.				1, 2	IN, IT
Internet Access					
8. Complete WAN installation across the district and increase bandwidth to schools to support high-speed Internet access				2	IT
9. Expand the use of e-mail to all staff and students who could benefit from it educationally.				2	IT

*** Goals Addressed:**

- 1 = Increasing student achievement through a consistent and comprehensive focus on teaching and learning.
- 2 = Creating capacity within the system to support and nurture a continuous learning environment focusing on student achievement.
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Strategies	Year 1-2	Year 3	Year 4	Goals Addressed*	Responsibility Level**
School Facilities and Learning Environments					
Facilities Issues					
1. Connect all classrooms and computers to the PSD networks.				2	IT
2. Examine all instructional areas in light of the need for viewing computer information, and develop a solution for typical instructional scenarios.				2	IT, SB
Building Wiring					
3. Allocate a permanent, dedicated location at each school from which all cabling operations and network operations can occur, following IEEE specifications.				2	IT
Technology Enriched Learning Environments					
4. Develop and support a consistent standard for the amount and type of technology in the typical classroom at each grade level and/or discipline.				2	PSD, IT, SB
Libraries/Information Resource Centers					
5. Implement a phased approach focused on transforming school libraries into information resource centers				2	IT, SB

*** Goals Addressed:**

- 1 = Increasing student achievement through a consistent and comprehensive focus on teaching and learning.
- 2 = Creating capacity within the system to support and nurture a continuous learning environment focusing on student achievement.
- 3 = Strengthening parent and public engagement.

**** Responsibility:**

- SB = School-based
- IT = Technology Division
- IN = Instructional Technology Staff
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- PSD = Central
- TF = Task Force

Strategies	Year 1-2	Year 3	Year 4	Goals Addressed*	Responsibility Level**
Communications and Network Infrastructure					
Networks					
1. Connect all remaining schools to a District WAN and consolidate the existing PSD networks into one.				2	IT
Communications and Internet Access					
2. Assign the function, roles, and responsibilities for District website development and the establishment of standards for program, school, and classroom websites.				3	IT
3. Develop and implement policies and procedures for providing all staff and students with individual network accounts.				2	IT
4. Use the infrastructure for the delivery of resources for teaching and learning, administrative efficiencies and advancing communication on all levels.				1, 2	IT
Voice and Video Communications					
5. Expand and use the video infrastructure to support full range of traffic including digital or streaming format and two-way communications.				1, 2	IT
6. Provide staff with voice mail services.				3	IT

*** Goals Addressed:**

- 1 = Increasing student achievement through a consistent and comprehensive focus on teaching and learning.
- 2 = Creating capacity within the system to support and nurture a continuous learning environment focusing on student achievement.
- 3 = Strengthening parent and public engagement.

**** Responsibility:**

- SB = School-based
- IT = Technology Division
- IN = Instructional Technology Staff
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- TF = Task Force

Strategies	Year 1-2	Year 3	Year 4	Goals Addressed*	Responsibility Level**
Administrative Computing and Decision Support					
Information Management					
1. Procure a data warehouse that integrates and enhances existing databases and operational systems.				2	IT
2. Develop and implement standards, policies, and procedures to replace manual form reports and data duplication with electronically managed data over the District-wide network.				2	IT
Decision Support					
3. Integrate and enhance existing databases through the implementation of a new unified, School Interoperability Framework (SIF)-compliant data warehouse that brings information from many operational systems and makes it available to users through easy to use Web-based data reporting and analysis software tools.				2	IT
Student Information Systems					
4. Select and deploy appropriate end user tools that can access the REG 2000, federal, state, and district-level databases and information to support the reporting and decision making needs of the schools.				2	IT
5. Provide upgrades to the REG 2000 system.				2	IT
6. Upgrade or procure a new Special Education System that is SIF compliant and interfaces real-time with other administrative systems including REG 2000.				2	IT

*** Goals Addressed:**

- 1 = Increasing student achievement through a consistent and comprehensive focus on teaching and learning.
- 2 = Creating capacity within the system to support and nurture a continuous learning environment focusing on student achievement.
- 3 = Strengthening parent and public engagement.

**** Responsibility:**

- SB = School-based
- IT = Technology Division
- IN = Instructional Technology Staff
- O = Specific Office
- PSD = Central
- TF = Task Force

Strategies	Year 1-2	Year 3	Year 4	Goals Addressed*	Responsibility Level**
Administrative Computing and Decision Support					
Financial and Human Resources					
7. Work with City of Providence personnel to implement the new Lawson system to its fullest extent.				2	IT
Other Systems					
8. Develop specifications for an inventory/fixed asset management system that integrates with existing administrative systems for finance, procurement, and inventory.				2	IT

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Strategies	Year 1-2	Year 3	Year 4	Goals Addressed*	Responsibility Level**
Human Resource Management and Development					
Staff Technology Competencies					
1. Identify technology competencies and performance levels for teachers, instructional support staff, library-media specialists, administrators, clerical staff, and technical support personnel.					IN, IT, TF
2. Include function-related technology competencies into human resource activities, such as, recruitment, hiring, staff development, supervision, and evaluation.					O, PSD
Staff Development Planning and Programs					
3. Encourage more teachers and principals to participate in the Department of Education/University of Rhode Island RITTI program to build their technology competencies.					PSD, SB
4. Establish a comprehensive staff development planning model to address the needs of all staff that includes parameters for district- and school-level technology training.					O
5. Incorporate targeted technology competencies and performance levels, prerequisite skills/experiences, and required hardware/software into all descriptions of technology-related staff development activities.					IN, O
6. Expand delivery models for technology-related staff development to make more learning options and time frames available for staff.					IN, O

*** Goals Addressed:**

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Strategies	Year 1-2	Year 3	Year 4	Goals Addressed*	Responsibility Level**
Human Resource Management and Development					
Staff Development Planning and Programs (continued)					
7. Develop and implement a competency-based Individual Staff Development Plan (ISDP) system.				2	PSD
Technology Staffing Support					
8. Establish district-wide guidelines and standards of service for both school-based and district-level technology support services.				2	IT, SB
9. Build the capacity of school-based staff to perform simple maintenance and basic trouble shooting tasks.				2	IT, SB
10. Establish regular meetings for school-based technology staff to meet, share learning, and address common issues.				2	IT, SB
Organizational Development					
11. Engage in function-based organizational analysis to determine optimal structure and staffing for district-level technology support services and to clarify roles, relationships, and critical interdependencies.					IT
12. Implement a student leadership program to supplement school-based technology support.					IT, SB
13. Develop as part of a district-wide human resource system, the capacity to store, manage and query personnel and competency-based human resource data.					O

*** Goals Addressed:**

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Strategies	Year 1-2	Year 3	Year 4	Goals Addressed*	Responsibility Level**
Standards, Policies, and Procedures					
Technology Standards					
1. Establish a Technology Standards and Policies Committee and adopt a process for periodically reviewing and setting standards for all major technology components including workstations, peripherals, networks, and system software.				2	IT
2. Procure and upgrade computing equipment for classrooms and other learning environments in accordance with established standards, allocation programs, and critical mass guidelines.				2	PSD, IT
3. Set clear policy regarding compliance with technology standards and establish a system for monitoring enforcement.				2	IT
Technology Policies					
4. Encourage policies and procedures at the school level for increasing student access to computers in libraries, labs and classrooms throughout the school day and after school hours.				1, 2	PSD, SB
5. Continue to research, develop and implement District-wide strategies regarding Internet filtering and acceptable use policies.				2, 3	IT
6. Develop clear policies, standards of service, and procedural guidelines regarding installation of new instructional technology equipment, upgrading and maintenance of older equipment, and phasing out of obsolete equipment.				2	IT

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Strategies	Year 1-2	Year 3	Year 4	Goals Addressed*	Responsibility Level**
Standards, Policies, and Procedures					
7. Develop and implement communications policies and procedures for the flow of information among District office, schools, administrators, teachers and parents.				2, 3	PSD, IT
Procurement Guidelines					
8. Continue to channel federal, state, and local grants and entitlements into technology resources and initiatives that address the District's instructional priorities.				1, 2	IT, SB
9. Establish a system to monitor and enforce compliance with technology procurement guidelines.				2	IT
10. Establish consistent communication systems to inform school personnel regarding all technology procurement procedures and guidelines.				2	IT
11. Develop inventory and tracking systems to enable monitoring of the deployment, use, and impact of technology resources.				2	IT
12. Ensure adherence to standards by assigning to each school someone knowledgeable about technology that can support people during the purchasing process to enable appropriate purchases compliant with standards.				2	IT

*** Goals Addressed:**

- 1 = Increasing student achievement through a consistent and comprehensive focus on teaching and learning.
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Strategies	Year 1-2	Year 3	Year 4	Goals Addressed*	Responsibility Level**
District-, School-, and Program-level Planning					
School-level Improvement Planning					
1. Review and assess the established criteria and processes for developing and reviewing Providence One Plans (POP).				2	PSD, TF
2. Implement POP enhancements such as, providing written feedback, building in flexibility for multi-year improvement initiatives, including professional development and technology resources into the model, and providing training and technical assistance to the school planning teams.				2	PSD, TF
3. Develop a web-based planning tool to facilitate the development, review and analysis of Providence One Plans district-wide.				2	IT
Program-level Planning					
4. Develop a program-level planning model to parallel elements of the school planning model and address technology integration to support programs and departments.				2	IF, TF
5. Customize the web-based school planning tool to accommodate the needs of specific district programs or departments.				2	IT

*** Goals Addressed:**

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Strategies	Year 1-2	Year 3	Year 4	Goals Addressed*	Responsibility Level**
Community Involvement					
Home/School Connections					
1. Increase parental involvement and communication using multiple strategies such as telephone, voice messaging, Internet, web posting, and e-mail.				3	PSD, IT
Community Learning Programs					
2. Seek ways to increase the number of technology-based community learning programs.				3	O, TF
Public Information Awareness					
3. Continue to implement the Registration Center Plan and evaluate its success on an annual basis.				3	SB
4. Assign a major function and provide informational resources within the Providence School District that addresses the needs of students, families and the community.				2, 3	PSD, O
5. Develop a comprehensive public information and internal communications plan for technology-related information.				3	O

APPENDICES

Appendix A:
***STUDENT TECHNOLOGY
COMPETENCIES***

National Educational Technology Standards (NETS) For All Students

(developed by ISTE, 1999)

The Technology Foundation Standards for students are divided into six broad categories:

- Basic operations and concepts
- Social, ethical, and human issues
- Technology productivity tools
- Technology communications tools
- Technology research tools
- Technology problem-solving and decision-making tools

Standards within each category are to be introduced, reinforced, and mastered by students. These categories provide a framework for linking performance indicators found within the Profiles for Technology Literate Students to the standards. Teachers can use these standards and profiles as guidelines for planning technology-based activities in which students achieve success in learning, communication, and life skills.

A major component of the NETS Project is the development of a general set of profiles describing technology literate students at key developmental points in their pre-college education. These profiles reflect the underlying assumption that all students should have the opportunity to develop technology skills that support learning, personal productivity, decision-making, and daily life. These profiles and associated standards provide a framework for preparing students to be lifelong learners who make informed decisions about the role of technology in their lives.

The Profiles for Technology Literate Students provide performance indicators describing the technology competence students should exhibit upon completion of the following grade ranges:

- Grades PreK - 2
- Grades 3 - 5
- Grades 6 - 8
- Grades 9 - 12

These profiles are indicators of achievement at certain stages in Pre K-12 education. They assume that technology skills are developed by coordinated activities that support learning throughout a student's education. These skills are to be introduced, reinforced, and finally mastered, and thus, integrated into an individual's personal learning and social framework. They represent essential, realistic, and attainable goals for lifelong learning and a productive citizenry.

The standards and performance indicators are based on input and feedback from educational technology experts as well as parents, teachers, and curriculum experts. In addition they reflect information collected from the professional literature and local, state, and national documents.

Technology Foundation Standards for Students

1. Basic operations and concepts

- Students demonstrate a sound understanding of the nature and operation of technology systems.
- Students are proficient in the use of technology.

2. Social, ethical, and human issues

- Students understand the ethical, cultural, and societal issues related to technology.
- Students practice responsible use of technology systems, information, and software.
- Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity.

3. Technology productivity tools

- Students use technology tools to enhance learning, increase productivity, and promote creativity.
- Students use productivity tools to collaborate in constructing technology-enhanced models, preparing publications, and producing other creative works.

4. Technology communications tools

- Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.
- Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.

5. Technology research tools

- Students use technology to locate, evaluate, and collect information from a variety of sources.
- Students use technology tools to process data and report results.
- Students evaluate and select new information resources and technological innovations based on the appropriateness to specific tasks.

6. Technology problem-solving and decision-making tools

- Students use technology resources for solving problems and making informed decisions.
- Students employ technology in the development of strategies for solving problems in the real world.

Profiles for Technology Literate Students GRADES PreK – 2

Performance Indicators:

All students should have opportunities to demonstrate the following performances.

Prior to completion of Grade 2 students will:

- Use input devices (e.g., mouse, keyboard, remote control) and output devices (e.g., monitor, printer) to successfully operate computers, VCRs, audiotapes, and other technologies. (1)
- Use a variety of media and technology resources for directed and independent learning activities. (1, 3)
- Communicate about technology using developmentally appropriate and accurate terminology. (1)
- Use developmentally appropriate multimedia resources (e.g., interactive books, educational software, elementary multimedia encyclopedias) to support learning. (1)
- Work cooperatively and collaboratively with peers, family members, and others when using technology in the classroom. (2)
- Demonstrate positive social and ethical behaviors when using technology. (2)
- Practice responsible use of technology systems and software. (2)
- Create developmentally appropriate multimedia products with support from teachers, family members, or student partners. (3)
- Use technology resources (e.g., puzzles, logical thinking programs, writing tools, digital cameras, drawing tools) for problem solving, communication, and illustration of thoughts, ideas, and stories. (3, 4, 5, 6)
- Gather information and communicate with others using telecommunications, with support from teachers, family members, or student partners. (4)

Profiles for Technology Literate Students GRADES 3 – 5

Performance Indicators:

All students should have opportunities to demonstrate the following performances.

Prior to completion of Grade 5 students will:

- Use keyboards and other common input and output devices (including adaptive devices when necessary) efficiently and effectively. (1)
- Discuss common uses of technology in daily life and the advantages and disadvantages those uses provide. (1, 2)
- Discuss basic issues related to responsible use of technology and information and describe personal consequences of inappropriate use. (2)
- Use general purpose productivity tools and peripherals to support personal productivity, remediate skill deficits, and facilitate learning throughout the curriculum. (3)
- Use technology tools (e.g., multimedia authoring, presentation, Web tools, digital cameras, scanners) for individual and collaborative writing, communication, and publishing activities to create knowledge products for audiences inside and outside the classroom. (3, 4)
- Use telecommunications efficiently and effectively to access remote information, communicate with others in support of direct and independent learning, and pursue personal interests. (4)
- Use telecommunications and online resources (e.g., e-mail, online discussions, Web environments) to participate in collaborative problem-solving activities for the purpose of developing solutions or products for audiences inside and outside the classroom. (4, 5)
- Use technology resources (e.g., calculators, data collection probes, videos, educational software) for problem solving, self-directed learning, and extended learning activities. (5, 6)
- Determine when technology is useful and select the appropriate tool(s) and technology resources to address a variety of tasks and problems. (5,6)
- Evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources. (6)

Profiles for Technology Literate Students GRADES 6 –8

Performance Indicators:

All students should have opportunities to demonstrate the following performances.

Prior to completion of Grade 8 students will:

- Apply strategies for identifying and solving routine hardware and software problems that occur during everyday use. (1)
- Demonstrate knowledge of current changes in information technologies and the effect those changes have on the workplace and society. (2)
- Exhibit legal and ethical behaviors when using information and technology, and discuss consequences of misuse. (2)
- Use content-specific tools, software, and simulations (e.g., environmental probes, graphing calculators, exploratory environments, Web tools) to support learning and research. (3,5)
- Apply productivity/multimedia tools and peripherals to support personal productivity, group collaboration, and learning throughout the curriculum. (3, 6)
- Design, develop, publish, and present products (e.g., Web pages, videotapes) using technology resources that demonstrate and communicate curriculum concepts to audiences inside and outside the classroom. (4, 5, 6)
- Collaborate with peers, experts, and others using telecommunications and collaborative tools to investigate curriculum-related problems, issues, and information, and to develop solutions or products for audiences inside and outside the classroom. (4, 5)
- Select and use appropriate tools and technology resources to accomplish a variety of tasks and solve problems. (5, 6)
- Demonstrate an understanding of concepts underlying hardware, software, and connectivity, and of practical applications to learning and problem solving. (1, 6)
- Research and evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic sources concerning real-world problems. (2, 5, 6)

Profiles for Technology Literate Students GRADES 9 –12

Performance Indicators:

All students should have opportunities to demonstrate the following performances.

Prior to completion of Grade 2 students will:

- Identify capabilities and limitations of contemporary and emerging technology resources and assess the potential of these systems and services to address personal, lifelong learning, and workplace needs. (2)
- Make informed choices among technology systems, resources, and services. (1, 2)
- Analyze advantages and disadvantages of widespread use and reliance on technology in the workplace and in society as a whole. (2)
- Demonstrate and advocate for legal and ethical behaviors among peers, family, and community regarding the use of technology and information. (2)
- Use technology tools and resources for managing and communicating personal/professional information (e.g., finances, schedules, addresses, purchases, correspondence). (3, 4)
- Evaluate technology-based options, including distance and distributed education, for lifelong learning. (5)
- Routinely and efficiently use online information resources to meet needs for collaboration, research, publication, communication, and productivity. (4, 5, 6)
- Select and apply technology tools for research, information analysis, problem solving, and decision making in content learning. (4, 5)
- Investigate and apply expert systems, intelligent agents, and simulations in real-world situations. (3, 5, 6)
- Collaborate with peers, experts, and others to contribute to a content-related knowledge base by using technology to compile, synthesize, produce, and disseminate information, models, and other creative works. (4, 5, 6)

Appendix B:
INSTRUCTIONAL UNIT PLAN MODEL

Sample Instructional Unit Plan

Title: Westward Ho!	Theme/Unifying Question: Hardships and obstacles encountered in the westward expansion of the United States
Contributors: Robert Milley and Marcia Kaplan, CELT Elementary School mkaplan@CELTk12.edu	
Grade Level(s): 4, 5 Subject Area(s): Social Studies, Language Arts, Music, Art, Literature (Reading), Science, Technology, Math Course(s):	
Goals/Standards: <ol style="list-style-type: none">1. Students will gain a greater understanding of the necessity of the westward expansion.2. Students will become aware of hardships and obstacles that the pioneers faced as they moved west.3. Students will experience and appreciate different perspectives concerning the westward movement.4. Students will describe growth and change in America, to 1861	
References: <ol style="list-style-type: none">1-3. School district Social Studies Curriculum Guide4. State Curriculum Frameworks in History and Social Science, Grades 5 - 8	

Instructional Rationale:

Students deserve an opportunity to learn beyond established curriculum guidelines. This unit provides:

- factual historical knowledge
- experiences involving personal and group interactions to heighten:
 - multicultural perspective awareness
 - environmental awareness
 - individual and group struggles
 - varied learning experiences
 - numerous modalities incorporated
 - individual pacing
 - alternative assessment

Materials/Equipment:

1. textbook with anthology
2. computer and presentation kit
3. tape recorder
4. TV with cable access and VCR
5. Internet access
6. trade books:
 - Sarah Plain & Tall
 - Little House on the Prairie
 - Great Little Madison
 - Freedom Train
 - Where the Sidewalk Ends
7. software: Oregon Trail (MECC)

Timeframe/Schedule:

The timeframe may vary from instructor to instructor depending on the individual's scheduling. Two to three weeks for an hour and a half each day is recommended.

Instructional Design:**A. CONTENT OBJECTIVES**

After completing this unit, students will have:

1. learned how the westward movement impacted the growth of the country
2. understood the concept of manifest destiny
3. learned the key leadership in the westward movement
4. demonstrated an understanding of the motivation for the westward expansion
5. recognized the dangers and obstacles to the settlers

B. PROCESS SKILLS

After completing this unit, students will have:

1. demonstrated proficiency in outlining and paraphrasing as note-taking techniques
2. used the multi-step writing process from research through publication
3. expressed empathy toward minority populations affected by mass westward expansion through oral presentations and debates
4. researched historical movements and events

C. TECHNOLOGY COMPETENCIES

After completing this unit, students will:

1. identify geographical and physical characteristics using online research sources
2. use database to collect, compare, and analyze data
3. upload and download written work via modem

Classroom Management/Organization:

Classroom organization will involve several grouping styles:

- classroom presentations involving whole class groupings
- computer discussion groups

Prerequisites:

1. keyboarding skills
2. basic math computations (+, -, x, ~)
3. writing process skills
4. use of menu bar (file, edit)
5. ability to create and edit written work using the word processor
6. access floppy disks and CD-ROMs

Instructional Activities, Strategies, and Products:**Week 1:**

1. Introduce unit using a film, such as "How the West Was Won."
2. Present the "Oregon Trail" (MECC) software to the whole class.
3. Divide class into wagon trains detailing their travels along the Oregon Trail via the computer program.

Week 2:

1. Create literary groups to read and present chosen trade books.
2. Use the music contained in the Anthology to reinforce the period. Have students create their own songs about their experiences along the Oregon Trail using established melodies.
3. Set up debate teams to express opinions of previously mentioned groups. Create rubrics to establish point system for debate.
4. Incorporate art activities to reinforce research such as creating tombstones, quilts, Conestoga wagons, log cabins, and 3-D maps.
5. Provide a physical education enrichment activity such as square dancing.

Week 3:

1. Integrate science through study of simple machines and their influence on westward expansion (e.g., plow and barbed wire). Have students invent a simple machine.
2. Have students create a list of pertinent Internet sites.
3. Include Snyder Park Western Days, a group chuckwagon luncheon, and display students' works as culminating activities.

Assessment Strategies:

The following assessment strategies should be used:

- 85% mastery on the textbook unit assessment
- 3-D scaled map detailing their students' progress along the Oregon Trail utilizing narrative prose
- rubrics
- standardized tests (textbook material)
- participation/teacher observation
- small group projects evaluated by peers as well as teacher

Teacher Notes:

Teaching strategies may be adapted to technologies available.

Technologies such as scanners, Quick Take cameras, Viewcams, etc., may also be incorporated to enrich presentations, if available.

Resources and Support:

Volunteers and chaperones
Trade books on the westward movement
Food for chuckwagon luncheon

Appendix C:
***STAFF TECHNOLOGY
COMPETENCIES***

Introduction

The following seven pages include four performance levels for each of the Teacher Technology Competencies. The identification of performance levels enables staff to consider their technology competency growth on a continuum. The performance levels can be most useful when incorporated into the written descriptions of staff development activities. By identifying the specific performance level that will be addressed in each technology-related staff development program, teachers can make better choices as to the activities that are most appropriate to their needs. The performance levels will enable the different individuals, groups and departments providing technology-related professional development to coordinated development efforts and reduce redundancies and gaps in service delivery. The performance levels also provide staff with a common language for discussing professional growth and development priorities. The importance of the district adopting a consistent set of Teacher Technology Competencies and Performance Levels has been discussed. The consensus is strong that one standard set is essential to continuity in professional development programs across the district. Therefore, the *Technology Blueprint* strongly recommends that the Teacher Technology Competencies and Performance Levels be adopted and promoted district-wide.

Teacher Technology Standards and Performance Levels

CATEGORY 1: Ethical and Legal Uses of Technology

1.1 Understands, models and promotes ethical and legal use of Technology.

1.1.1 Foundational Level

Recognizes importance of, and models adherence to, copyright law as it applies to using technology resources, including digital and video media, in daily practice.

1.1.2 Intermediate Level

Promotes school-based dialogue on the legal and ethical use of technology among students and colleagues, including issues such as: changes in laws, fair use, equitable access, privacy and confidentiality, computer viruses, illegal hacking, free speech and censorship, harassment, pornography, hate mail, personal safety, etc. Promotes adherence to legal and ethical standards in student projects and discussions of technology-based solutions to societal problems.

1.1.3 Advanced Level

Engages with students and colleagues in collaborative rule making and self-regulation related to ethical and legal use of technology. Provides input to policy formation.

1.1.4 Mentor/Coach Level

Provides formal and/or informal training to enable others to develop this competency.

CATEGORY 2: Basic Computer Operations and Troubleshooting

2.1 Uses basic computer systems and performs simple troubleshooting for computer systems and related peripherals.

2.1.1 Foundational Level

Uses basic computer systems, operations, and peripherals to perform simple tasks (e.g., boots up machines and loads/launches programs, saves and retrieves files to disk and hard drive, install software, select printers).

2.1.2 Intermediate Level

Uses basic computer systems, operations, and peripherals to perform more advanced tasks (e.g., navigate a variety of graphical user interfaces; operate peripheral devices such as VCR, monitor, laserdisc player, CD-ROM player, modems, scanners, fax machines, et; create directories; navigate through the network directory).

2.1.3 Advanced Level

Performs simple troubleshooting of computer systems and related peripherals (e.g., operates virus scan, checks connections, reinstalls software, checks file extensions and software versions for compatibility).

2.1.4 Mentor/Coach Level

Provides formal and/or informal training to enable others to develop this competency.

CATEGORY 3: Word Processing and Desktop Publishing**3.1 Uses productivity features of word processing.****3.1.1 Foundational Level**

Uses basic word processing functions to create syllabi, lesson plans, tests, class lists, reading lists, communications, etc.

3.1.2 Intermediate Level

Uses more advanced word processing functions (e.g., inserts tables; creates table of contents; inputs headers/footers, formats documents) to create reports, papers, and communications.

3.1.3 Advanced Level

Integrates other productivity applications into word processed documents (e.g., spreadsheets, databases, graphics).

3.1.4 Mentor/Coach Level

Provides formal and/or informal training to enable others to develop this competency.

3.2 Utilizes productivity features of desktop publishing and graphics programs and utilities.**3.2.1 Foundational Level**

Uses basic desktop publishing features (e.g., layout, margins) and graphics (e.g., import/export and draw functions) to create announcements, bulletins, etc.

3.2.2 Intermediate Level

Uses more advanced desktop publishing and graphics features to edit and manipulate newsletters and other complex document templates (e.g., multi-layered images; master pages; shading; snap-to grids; translate, scale, crop, and rotate objects; scanners).

3.2.3 Advanced Level

Uses complex desktop publishing and graphics features (e.g., multi-layered images; master pages; shading; snap-to grids; translate, scale, crop, and rotate objects; scanners) to create templates and other complex documents.

3.2.4 Mentor/Coach Level

Provides formal and/or informal training to enable others to develop this competency.

CATEGORY 4: Spreadsheets and Databases**4.1 Uses spreadsheets for analyzing, organizing, and graphically displaying numerical data.****4.1.1 Foundational Level**

Uses pre-construct spreadsheets to store, analyze and present data.

4.1.2 Intermediate Level

Designs and constructs simple spreadsheets using row/column setup, print area setup, sort function, borders and lines, addition and subtraction. Provides opportunities for students to use spreadsheet data to predict and analyze hypotheses, assumptions, and arguments.

4.1.3 Advanced Level

Uses more advanced features/formulas of spreadsheets to compute, analyze and present calculations for budgets (complex calculations, graphs, et). Designs and constructs complicated, interrelated spreadsheets for computing and presenting complex calculations and relationships (e.g., multiple worksheets).

4.1.4 Mentor/Coach Level

Provides formal and/or informal training to enable others to develop this competency.

4.2 Develops and manages databases (including the MLSD Student Information System (SIS)), and generates customized reports.**4.2.1 Foundational Level**

Accesses and manipulates existing databases to generate reports.

4.2.2 Intermediate Level

Develops and creates customized databases, or database subsets, to manipulate data and generate customized reports.

4.2.3 Advanced Level

Merges data from multiple databases, executes complex queries, and imports data to a variety of other productivity applications (e.g., word processing, spreadsheets) to communicate and present data.

4.2.4 Mentor/Coach Level

Provides formal and/or informal training to enable others to develop this competency.

CATEGORY 5: Telecommunications and Research**5.1 Communicates and shares information through e-mail.****5.1.1 Foundational Level**

Uses basic e-mail functions to communicate and share information, and as a tool for professional development (e.g., sends and receives attachments; formats text; organizes messages into folders, et).

5.1.2 Intermediate Level

Uses full range of e-mail features to communicate and share information (e.g., uses address book; finds appropriate newsgroups/listservs and downloads messages for offline reading).

5.1.3 Advanced Level

Uses more complex e-mail features to communicate and share information (e.g., stuffs and unstuffs files; translates attachments into different formats; customizes e-mail windows; operates Internet browser from e-mail).

5.1.4 Mentor/Coach Level

Provides formal and/or informal training to enable others to develop this competency.

5.2 Researches and evaluates online information.**5.2.1 Foundational Level**

Uses school/district databases, including those provided by instructional publishers, to research information. Evaluates the appropriateness and quality of information resources. Integrates on-line resources into reports, presentations, spreadsheets, etc. Understands and promotes district's Internet Use Policy. Engages students in discussion of issues of personal safety and Internet use.

5.2.2 Intermediate Level

Uses web browsers, on-line search engines to research information. Customizes web browsers. Promotes student evaluation of the appropriateness and quality of information resources. Uses and promotes safe search protocols (e.g., uses virus scanning software; protects computer from unsafe software; uses secure Internet sites; protects password and credit card information). Storing and organizing bookmarks.

5.2.3 Advanced Level

Uses advanced syntax and search processes, and builds complex search strategies to effectively and efficiently obtain information resources. Uses telecommunications to access professional development resources. Imports text/graphics/video from web sites.

5.2.4 Mentor/Coach Level

Provides formal and/or informal training to enable others to develop this competency.

CATEGORY 6: Instructional Design and Learning Environment Management**6.1 Applies instructional design theories and principles to the integration of technology tools and applications into instructional units.****6.1.1 Foundational Level**

Integrates content-appropriate, easily accessible technology resources into instructional units/lessons and instructional practices (e.g., presentation tools, graphing applications, video, simulations, probes and sensors, CD-ROM, projection devices, adaptive-assistive devices).

6.1.2 Intermediate Level

Integrates multimedia software and equipment into instructional practices; and integrates use of web sites, bookmarks, and search engines into instructional units/lessons.

6.1.3 Advanced Level

Creates simulations to facilitate exploratory and discovery learning. Uses appropriate software for animations and diagrams. Utilizes pedagogic guidelines for synchronous and asynchronous distance learning, including: web-based courses, satellite courses, teleconferencing, e-mail-based courses, data manipulation technologies, etc.

6.1.4 Mentor/Coach Level

Provides formal and/or informal training to enable others to develop this competency.

6.2 Applies knowledge of learning environment dynamics to the effective integration of technology tools and applications to teaching and learning (e.g., using simulations or technology-supported cooperative learning activities to support exploratory/discovery learning and critical thinking; managing the learning environment to promote effective interaction among instructional staff, students, and technology resources).**6.2.1 Foundational Level**

Selects and manages appropriate, basic technology tools to optimize human interaction and learning (e.g., presentation tools, graphing applications, video, CD-ROM, simulations, probes and sensors, projection devices). Understands the strengths and challenges of incorporating a variety of technologies into different learning environments, and uses this knowledge to select the most appropriate mix of resources, structures, and processes.

6.2.2 Intermediate Level

Selects and manages appropriate, intermediate level technology tools to optimize human interaction and learning (e.g., multimedia, web searches, web-based courses, satellite courses, teleconferencing, e-mail-based courses, data manipulation technologies).

6.2.3 Advanced Level

Researches, pilots, and assesses the effectiveness/appropriateness of new and emerging instructional technologies within different learning environments.

6.2.4 Mentor/Coach Level

Provides formal and/or informal training to enable others to develop this competency.

6.3 Uses technology tools to enhance teaching and instructional delivery (e.g., presentation software, video, slides, projection devices, simulations, probes and sensors, “smart classrooms”).**6.3.1 Foundational Level**

Uses videos, slides, and projection devices to enhance teaching and instructional delivery. Understands basic design principles and capabilities of presentation software.

6.3.2 Intermediate Level

Uses text-based presentation software, “smart classrooms” technologies, and content-appropriate data manipulation devices (probes, simulations, sensors) to enhance teaching and instructional delivery.

6.3.3 Advanced Level

Uses advanced features of presentation software (including video clips, graphics, sound clips) to enhance teaching and instructional delivery.

6.3.4 Mentor/Coach Level

Provides formal and/or informal training to enable others to develop this competency.

6.4 Uses appropriate, research-based, technology-supported assessment practices to evaluate student learning.**6.4.1 Foundational Level**

Uses word processed student writing samples with performance measures/rubrics to evaluate student learning (e.g., essays, papers).

6.4.2 Intermediate Level

Uses technology-generated or supported student projects with performance measures/ rubrics to evaluate student-learning (e.g., electronic presentations, demonstrations, models, videos, and creative/graphic arts).

6.4.3 Advanced Level

Uses electronic portfolios including various types of technology-supported student work with performance measures/rubrics to evaluate student learning.

6.4.4 Mentor/Coach Level

Provides formal and/or informal training to enable others to develop this competency.

Appendix D:
SCHOOL-BASED ASSESSMENT RUBRIC

Rubric Assessment Instrument

VARIABLE	INDICATOR	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
Access	Connection	No connection exists between classrooms or with outside resources.	Some part of school is connected to Internet, district-wide network, or intrabuilding network.	Some part of school is connected to Internet, district-wide network, and intrabuilding network.	Entire school is connected to Internet, district-wide network, and intrabuilding network.
	Universality	Technology resources and equipment are located centrally.	Technology resources and equipment are in a few locations and convenient for some individual use.	Technology resources and equipment are in several locations in the building and convenient for individual use by several users.	Technology resources and equipment are pervasive and conveniently located for individual use.
	Interconnective	Few students and teachers interact by communicating and collaborating in diverse ways.	Some students and teachers interact by communicating and collaborating in diverse ways.	Many students and teachers interact by communicating and collaborating in diverse ways.	Students and teachers interact by communicating and collaborating in diverse ways.
	Equitable use	Few/No students have access to rich, challenging learning opportunities and interactive, generative instruction.	Some (select) students have access to rich, challenging learning opportunities and interactive, generative instruction.	Many students have access to rich, challenging learning opportunities and interactive, generative instruction.	All students have access to rich, challenging learning opportunities and interactive, generative instruction.

VARIABLE	INDICATOR	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
Organization	Distributed	Technology/system resources are completely centralized.	Technology/system resources are quite centralized.	Technology/system resources are somewhat centralized.	Technology/system resources are not centralized but exist across any number of people, environments, and situations.
	Designed for user contribution	Users cannot provide input/resources to the technology/system.	In some instances, users can provide input/resources to the technology/system.	In many instances, users can provide input/resources to the technology/system.	Users can provide input/resources to the technology/system on demand.
	Designed for collaborative projects	Technology cannot communicate among users with diverse systems/equipment.	Technology can communicate among users with diverse systems/equipment with great difficulty.	Technology can communicate among users with diverse systems/equipment with some difficulty.	Technology is designed to facilitate communication among users with diverse systems/equipment.
Engagability	Access to challenging tasks	Technology offers no opportunities that stimulate thought and inquiry.	Technology offers few users access to tasks, data, and learning opportunities that stimulate thought and inquiry.	Technology offers many users access to tasks, data, and learning opportunities that stimulate thought and inquiry.	Technology offers or allows access to tasks, data, and learning opportunities that stimulate thought and inquiry.
	Enables learning by doing	Technology offers little access to simulations, goals-based learning, and real-world problems.	Technology offers some access to simulations, goals-based learning, and real-world problems.	Technology offers significant access to simulations, goals-based learning, and real-world problems.	Technology offers pervasive access to simulations, goals-based learning, and real-world problems.

VARIABLE	INDICATOR	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
	Provides guided participation	Technology is single-purpose, one-dimensional and offers no alternative routes.	Very little technology responds intelligently to user or is able to diagnose and prescribe new learning.	Some technology is able occasionally to diagnose and prescribe new learning.	Technology responds intelligently to user and is able to diagnose and prescribe new learning.
Ease of use	Effective Helps	Technology provides no help.	Technology provides few help indices that explain the procedures for using the technology.	Technology provides some help indices that explain clearly the procedures for some tasks and routines.	Technology provides help indices that are more than glossaries; may provide procedures for tasks and routines.
	User friendliness	Technology does not facilitate use.	Technology often fails to help the user or allow access to data and tools as they are needed.	Technology often helps the user and usually allows the user to access data and tools as they need them.	Technology facilitates user and is free from overly complex procedures; user can easily access data and tools on demand.
	Speed	Technology is often slow and is usually down for long periods of time.	Technology is sometimes slow and down for long periods of time.	Technology has a reasonable speed and is rarely down for long periods of time.	Technology has a fast processing speed and is not 'down' for long periods of time.
	Available training and support	Training and ongoing support are not available.	Training is sporadically available. Ongoing support is often not available.	Training is available at a remote site. Ongoing support is available, but not immediately.	Training is readily and conveniently available, as is ongoing support.

VARIABLE	INDICATOR	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
	Provides just enough information just in time.	Technology allows for minimal access and minimal types of information.	Technology allows for controlled access, single point of entry and static range of levels and types of information.	Technology allows for random access, single point of entry and a narrow range of levels and types of information.	Technology allows for random access, multiple points of entry, and different levels and types of information.
Functionality	Diverse Tools	Technology does not enable access to tools basic to learning and working in the 21 st Century.	Technology enables access to some diversity of generic and context-specific tools basic to learning and working in the 21st century.	Technology enables access to much diversity of generic and context-specific tools basic to learning and working in the 21st century.	Technology enables access to full diversity of generic and context-specific tools basic to learning and working in the 21st century.
	Media use	Technology provides little/no opportunity to use media technologies.	Technology provides few opportunities to use media technologies.	Technology provides some opportunities to use media technologies.	Technology provides opportunities to use media technologies.
	Links student data, learning objectives, resources, and assessments	Teachers have little/no electronic access to information regarding curriculum objectives, resources, or assessment data.	Teachers can access curriculum information, and/or data on resources, assessments, and students' performance, but these are not linked.	Teachers can access linked information on learning outcomes and available resources.	Technology enables teacher access to components of a curriculum development/learning management system.
	Supports project design skills	Technology does not facilitate the development of skills related to project design and implementation.	Technology facilitates little development of skills related to project design and implementation.	Technology facilitates some development of skills related to project design and implementation.	Technology facilitates the development of skills related to project design and implementation.

Appendix E:
ACCEPTABLE USE POLICY



Internet Acceptable Use Policy

Policy and Purpose

- The Providence School Department provides access to our computer network to students and staff so as to promote and enhance the learning of our students through communication, innovation, and sharing of resources.
- The Providence School Board supports access by staff and students to the rich educational resources available on the Internet. The use of the internet must be for educational and research activities and be consistent with the educational objectives of the Providence School Department.
- Staff and students will be instructed on the appropriate use of the internet. Parents will be required to sign a permission form to allow their students to access the internet. Staff and students will sign a form acknowledging they have read and understand the Internet Acceptable Use Policy, that they will comply with the policy and understand the consequences for violating the policy.
- All staff and students of the Providence School Department take full responsibility for their own actions in regards to the use and handling of technology and the use of the internet, network and email.
- The Providence School Department makes no warranties of any kind, whether expressed or implied, for the service it is providing. The Providence School Department will not be responsible for any damages the user suffers, including but not limited to the loss of data, delays, non-deliveries, or service interruptions caused by its negligence or the users' errors or omissions.
- I have read the Providence School Department's "Internet Acceptable User Policy" and I understand and agree to abide by the terms of this request for network access, and the Providence School Department's rules for acceptable use of network resources. I understand that I am solely responsible for all charges and fees, including outside telephone, printing, and merchandise purchases made through the network. The Providence School Department is not a party to such transactions and shall not be liable for any costs or damages, whether direct or indirect, arising out of network transactions by the user.
- In addition, I acknowledge that the Providence School Department's computer network belongs solely to the Providence School Department and that any files, records, electronic mail or other communication may be examined, edited, or deleted by the Providence School Department at any time, in accordance with the Providence School Department's policy or regulations. In general, electronic mail in personal accounts will not be inspected without the consent of the sender or a recipient, except as necessary to investigate a complaint.

<hr/> <hr/> Filtering	<ul style="list-style-type: none"> • The Providence School Department complies with CIPA, the Children Information Protection Act. CIPA requires that schools and libraries that receive specific federal funds must certify to the funding agency that they have in place an Internet Safety Policy. This policy requires blocking access to obscenity, child pornography, or , as to students, material harmful to minors. *In accordance with all elements and regulations of CIPA. This policy also prohibits hacking, use of chat rooms, disclosure of personal information concerning children, and unlawful activities involving children online. It also provides for the safety and security of minors while using electronic mail and other forms of electronic communication. • The internet will be filtered, in accordance with CIPA to limit users to educationally appropriate sites, as determined by the Providence School Board. At the same time, the Providence School Department is aware that material on the internet is uncensored and we can make no guarantee that information found on the internet will be reliable or inoffensive. • The filtering system may be disabled by a teacher for students and by the administration for bona fide research or other lawful purposes. <p><i>* E-rate schools, minors 47 USC § 254(h)(5)(B)(i); E-rate schools, adults 47 USC § 254(h)(5)(C)(i); libraries, minors 47 USC § 254(h)(6)(B)(i); libraries, adults 47 USC § 254(h)(6)(C)(i); Schools under Education Act Sec. 3601(a)(1)(A)(i); Libraries under Museum and Libraries Act 20 U.S.C. 9134(f)(1)(A)(i).</i></p>
<hr/> <hr/> Acceptable Use	<ul style="list-style-type: none"> • Acceptable use of computers and related devices, networks, and internet access is any use, which is consistent with the educational objectives of the Providence School Department. The internet offers a wealth of information, the opportunity for the exchange of ideas and information, and the possibility of collaborative work. • All communications should be polite with appropriate language use. Use of computers, networks, network equipment and internet access is a privilege for staff and students and not a right. We expect staff and students to use these tools in a responsible manner for educational purposes and to be considerate of all other users. • Student personal information (including, but not limited to; names, phone numbers, addresses, etc.) will not be entered, transmitted, or posted over the internet for public use without prior written authorization by school administration. • Students will never agree to meet someone they have met on-line without parental written approval. Parents who agree to such a meeting are responsible for arranging appropriate supervision. • Staff and students will not use the network or the internet in such a way as to disrupt access by others (such as downloading huge files, sending mass e-mail messages, or annoying/harassing other users). Respect the privacy of other users – all communications and information is the property of the Providence School Department.

<hr/> Unacceptable Use of the Internet	<ul style="list-style-type: none">• It is unacceptable to use the network and the internet in any way to promote or engage in any activities which are deemed criminal under federal, state, or local laws, including but not limited to copyright, credit card and electronic forgery laws or anything that is not within the scope of educational use.• It is unacceptable use to maliciously attempt to harm or destroy the hardware or data of another user, whether in school or any site connected to the internet. This includes, but is not limited to, the creation and spreading of computer viruses. It is also unacceptable use to attempt to use another's password or account. Personal use of the computers for non work related activities such as game playing is not acceptable during the workday.• It is unacceptable use to send or receive any data which is profane or obscene that advocates illegal acts, that advocate violence or discrimination toward people or organizations, or that is not within the scope of educational use.• It is unacceptable to connect any personal computing device to the district's network without written permission from the Office of Technology. It is unacceptable use to engage in activity for private or financial gain.
<hr/> Violation of Policy	<ul style="list-style-type: none">• General school rules and policies apply to all school computer use, internet activity and communication.• If a user is found to be in violation of any of the statement detailed in the above mentioned policy, all network and internet rights and privileges will be suspended until an investigation is conducted. Upon completion of the investigation a decision will be given by the Building Administrator(s) to revoke or reinstate the computer user's privileges. Such violations may also result in further disciplinary measures or legal actions.



User Agreement And Parental Consent Form

The Student:

I have read the Providence School Department's "Internet Acceptable User Policy" and I understand and agree to abide by the terms of this request for network access, and the Providence School Department's rules for acceptable use of network resources. I understand that I am solely responsible for all charges and fees, including outside telephone, printing, and merchandise purchases made through the network. The Providence School Department is not a party to such transactions and shall not be liable for any costs or damages, whether direct or indirect, arising out of network transactions by the user.

In addition, I acknowledge that the Providence School Department's computer network belongs solely to the Providence School Department and that any files, records, electronic mail or other communication may be examined, edited, or deleted by the Providence School Department at any time, in accordance with the Providence School Department's policy or regulations. In general, electronic mail in personal accounts will not be inspected without the consent of the sender or a recipient, except as necessary to investigate a complaint.

I further understand that should I commit any violation, my access privileges may be revoked, and school disciplinary and/or appropriate legal action may be taken. In consideration for using the Providence School Department's network connection and having access to public networks, I hereby release the Providence School District and its School Board members, employees, and agents from any claims and damages arising from my use, or inability to use, the network.

I understand that the use of the internet is a privilege, not a right. I further understand that any violations of the above guidelines will result in immediate suspension of my internet privileges, and that as a result of such violations further disciplinary measures may be taken.

Print Student's Name

Student's Signature

Date Signed

I am the parent/guardian of the above named student. I have read the Providence School Department's "Internet Acceptable Use Policy" and I understand and agree to all of the provisions, rules, and regulations delineated within. I hereby give permission for my child to use the internet service provided by the Providence School Department. I do understand that my child is required to follow this policy. I further understand that there is a potential for my son/daughter to access information on the internet that is inappropriate for students and that every reasonable effort will be made on the part of the faculty and staff of the Providence School Department to restrict access to such information, but that my son/daughter is ultimately responsible for restricting himself/herself from inappropriate information.

Print Parent/Guardian's Name

Parent/Guardian's Signature

Date Signed

Appendix F:
Sample Job Responsibilities

Chief Technology Officer

Type: Existing Full-time Position

Responsibilities

- Manages district technology staff and all projects
- Develops the long-term and short-term project plans to enhance learning and teaching through educational technologies, guiding the design and development of infrastructure and web-based delivery systems
- Prepares budgets and generates purchase orders and related expense reports.
- Performs a building-by-building analysis of the facilities to ensure adequate, data, voice, video, electrical and wide-area and Internet are available.
- Develops the specifications and scope of work efforts for all projects and researches appropriate funding through resources such as the e-rate and ESEA programs.
- Recommends the resources for implementing the contracted technology services.
- Ensures that all policies, procedures, bid processes Requests for Proposals (RFPs) and paperwork are followed and submitted.
- Ensures the provision of adequate district-wide user support and assistance for computer-related technology.
- Supervises technology employees (especially building level technology support staff)
- Develops and implements of district technology policies and procedures
- Performs skilled work in the design, installation, configuration and maintenance of computers, network systems, and other related equipment
- Requisitions and maintains an adequate supply of parts and repair materials
- Coordinates in-service training programs relative to the operation and maintenance of computers, network systems, and electronic equipment
- Serves as primary district e-mail postmaster, and systems administrator,
- Coordinates interrelations between district server resources coordinates special projects as necessary
- Writes grant proposals as appropriate
- Acts as K-12 resource person advising schools on software and hardware purchases and makes recommendations
- Evaluates hardware and software, and helps coordinate software licenses and inventories in conjunction with Director of Instructional Technology
- Provides leadership to the District Educational Technology Committee, assisting in the design and implementation of technology plans and retrofitting activities
- Coordinates technology demonstrations and technology tours
- Delivers technology presentations to groups.
- Acts as district technology liaison to the community
- Develops system for technology repair and maintenance
- Coordinates responses to requests for assistance
- Troubleshoots software, hardware and Telecommunications problems.
- Estimates time and cost of materials required for work orders and other related requests.
- Ensures internal inventory of computer and networking parts and supplies
- Compiles and prepares reports and presentations as required.
- Compiles and prepares reports and presentations as required

Network Manager/City Hall Coordinator

Type: New Position

Responsibilities

- Provides technology support and assistance for:
 - Computer systems connected to networks
 - Telephone services
 - Closed circuit television/security systems
 - Library cataloging system
 - Building-wide LAN network
 - Building-wide integrated networks
 - Audio/video distance learning systems
 - District level computer networks/headends
 - School administrative computer systems
 - Regional networks, distance learning, internet, cable TV
- Works with the IT department of the Providence City Hall to coordinate the integration of the Financial and HR package with the school system
- Monitors and manages all network performance
- Makes recommendations and implements network upgrades.
- Provides evaluation and acceptance testing of third-party installations, understanding of all aspects of data storage on hard disks and be able to recover both network and systems from hard disk crashes with minimal data loss.

Technology Support and Consultants

Type: New Position, contracted services or outsourced

Responsibilities

- Assists in providing technology support and assistance for:
 - Stand alone computer systems
 - Telephone services
 - Closed circuit television/security systems
 - Library cataloging system
 - Building-wide LAN network
 - Building-wide integrated networks
 - Audio/video distance learning systems
 - District level computer networks/headends
 - School administrative computer systems
 - Regional networks, distance learning, internet, cable TV

REG 2000 Team

Type: Contracted Service

Responsibilities

- Assumes the responsibility for development, deployment, and project management of the REG 2000 Student Information System and new modules.
- Works with the DSS staff to deploy a solution that will provide decision support to a wide range of users with information that comes from the REG 2000 and a variety of other existing and projected operational information systems.
- Develops the queries, templates and reports for supporting a local decision support requirements
- Works with the Rhode Island Department of Education to implement a system for ensuring that the data is available and in a useable format for meeting state reporting requirements and the district's needs for decision support
- Coordinates and maintains the access by departmental staff to the Student Information System (REG 2000) online, query, and web components for a designated area or department

Decision Support System (DSS) Team

Type: Contracted Service

Responsibilities

- Deploys a total DSS solution that will provide decision support to a wide range of users with information that comes from a variety of existing and projected operational information systems.
- Develops the requirements, specifications, and project plans for implementing a data warehouse for integrating all the necessary applications into an effective decision support system.
- Assumes the responsibility for development, deployment, and project management of the DSS.
- Develops the queries, templates and reports for supporting a local decision support requirements.
- Works with the Rhode Island Department of Education to implement a system for ensuring that the data is available and in a useable format for meeting state reporting requirements and the district's needs for decision support.

Coordinator Technical Services

Type: New Position

Responsibilities

- Provides technical assistance to third party support organizations such as telephone companies, contract repair technicians and network installers, and other service providers.
- Provides district-wide technical support and leadership for both academic and administrative technology needs.
- Constructs special purpose computer equipment
- Supervises resources services in the diagnosis, installation, operation, and use of wide area data networks
- Provides for and assists in the planning and supervision of cabling for local and wide area network
- Supervises and assists in analyzing local area and wide are network traffic
- Provides network cabling and the diagnosis of site-based local and wide -area network hardware and peripheral equipment

Technical Services Expediter

Type: Current Position

Responsibilities

- Designs, modifies, installs and supports district-wide computer networks
- Manages and builds both computer systems and networks from the ground up including hard disk set up, network interface card configuration and oversight of network routers, hubs and patch panel installations
- Performs ongoing maintenance system activities such as coordination and maintenance of user accounts and reference tables, maintenance of business rules, data error corrections, data validation and job monitoring activities

Field Support Specialist

Type: Current Position

Responsibilities

- Provides on site support with setup and operation of computers and printers, installation of systems software; installation, configuration, and support of district approved software; assists and supports with PSD net (internet, MS Exchange, RI-Net and any other applications that are implemented in the district); inspect and troubleshoot problems with computers and their peripherals, file servers, controllers, routers, etc.
- Continued support in the areas of memory up grading, problem diagnosis and recommended repair, etc.
- Assists and supports with application software for educational and administrative purposes.
- Responds to inquiries for solutions to problems using existing software packages as they are developed for school use. This includes training and support in these areas.
- Acts as technology consultant to the school or department organization
- Works with the technical contact persons in their assigned schools or department and act as an interface with assigned sites and Office of Technology (OT). Assists with the training of the designated technical contact person.
- Supports desktop operating systems, MAC OS, DOS, Windows.
- Supports the OT Helpdesk (once implemented) on technical issues.
- Provides updates, status and completion information to Senior Director of Technology or their designee, problem request tracking system (once implemented) and/or users.
- Reinstall defective or inadequate software packages.
- Assists school personnel with Network designs.
- Provides Network technical support to school departments.
- Trains district personnel in Network use.
- Writes and updates technical documentation that described Network functions at the user level.
- Installs and configures Network devices at the user desktop and tests for functionality with software on District standards list.
- Keeps abreast of changing hardware and software technology.
- Provides training and support in the use of student application software (Currently REG but subject to change).
- Assists schools prepare for the opening of school each fall. This includes verifying all systems are operational and fully configured for use with all updates and such.
- Responsible for inventory and asset tracking of hardware in the schools. This includes data input of this information in the district system.
- Assists, supports and trains in the use of REG, as well as, any other district software such as MS Office, Exchange, etc.
- Assists schools with maintaining and assuring data integrity, security and consistency.
- Assists schools in implementing new or modified systems or procedures developed or purchased centrally.

Help Desk and PC Technicians

Type: Existing and New Positions

Responsibilities

- Provides the primary technical trouble shooting services
- Repairs and diagnoses computer hardware, peripheral equipment, and software in the school building throughout the district
- Retrieves lost data from hard or floppy media after accidental deletion or disk crash utilizing appropriate utilities
- Troubleshoots problems related to computer and network systems
- Utilizes a variety of electronic testing equipment
- Aligns, adjusts and calibrates equipment in accordance with specifications
- Replaces defective components and wiring

Other Contracted Services for Repair

Type: Existing and new contracted services

Responsibilities

- Works with the technology staff to provide technology support, repairs, and diagnosis of computer hardware, peripheral equipment, and software for the district and at the school building level.

Director of Instructional Technology

Type: Existing full-time position

Responsibilities

- Provides leadership and direction in the development of instructional materials and teaching aids.
- Provides District-wide Technology Leadership and Team Building
- Plans and delivers professional development to educators and other professionals focused on integrating technology into the curriculum
- Oversees and trains staff in procedures, techniques, and methods of assigned projects
- Participates in the selection of assigned staff and conduct performance evaluation.
- Assesses needs of educator audiences, devises strategies, and creates programs of professional development that respond to identified needs
- Creates and maintains the e District's website
- Provides guidance and support to sites in creating and maintaining web-based homepages.
- Integrates Web-based teacher professional development with in-person professional development.
- Advises school sites regarding hardware and software purchases

Director of Instructional Technology (continued)

Responsibilities

- Makes recommendations to the district's Chief Technology Officer
- Organizes training on the use of software applications, hardware and presentation technology
- Establishes a hot line for site assistance as it relates to technology curriculum integration
- Works with business/community to establish alternative funding for technology
- Provides grant writing assistance to sites
- Acts as a resource to subject area specialists and resource staff
- Works with the Personnel Department to rewrite job descriptions to reflect technology skills
- Meets regularly with key site technology persons to train, retrain and inform
- Schedules and coordinates quarterly technology fairs
- Publicizes state, county and district technology conferences and workshops
- Works with the Chief Technology Officer to establish a plan for maintenance, replacement, upgrading and updating equipment
- Develops opportunities to reward and provide incentives to staff who have demonstrated outstanding use of technology in the classroom
- Identifies and showcases students who display exceptional technology skills and talent
- Provides direction for classified personnel assigned to the Educational Media Centers
- Processes orders, receives state instructional materials and maintains appropriate records.
- Serves on District committees as assigned.
- Refers teachers to video services.
- Disseminates current literature and research which might contribute to the improvement of instruction.
- Maintains a professional library including periodicals.
- Assists building administrators in designing and developing school-level media facilities.
- Maintains personal professional growth pertaining to new trends, theories, and research in media and technology through active participation in selected work-related responsibilities, university classes and seminars.
- Seeks and maintains knowledge and awareness of the current scope and sequence of the curriculum and is proficient in the delivery of instruction principles and practices.
- Consults with staff on integrating electronic information resources into courses, including creating guides, tutorials, and reference lists.
- Assists staff in distance education including web-based and interactive television technologies.
- Works closely with staff to identify, evaluate, and recommend instructional resources, professional development activities, and Technology software and hardware based on user-defined needs.

Technology Integration Mentors

Type: Shared positions contracted or release time. (Funded as part of Professional Development)

Responsibilities

- Focuses on the direct delivery of services to support districts in improving student achievement through technology integration.
- Models and trains staff in the effective use of instructional media materials and equipment in the classroom, professional activities, and public presentations.
- Works with administrators, teachers and staff in utilizing REG 2000 for tracking students and decision support.
- Collaborates with teachers to integrate technology into instruction
- Co-teaches to integrate technology
- Creates technology operating/training aids
- Offers short technology training workshops
- Assists with the introduction of new technology related curriculums
- Provides technology training to students
- Acts as a resource to building-level subject area specialists and resource staff
- Assists in the development of professional competencies and skills of local district instructional media personnel.
- Assists in the selection of effective curriculum and professional development resources and increase the usage and integration of the materials into the learning process.

Professional Development Providers

Type: Contracted Services (Funded as part of Professional Development)

Responsibilities

- Provides training services the staff under the direction of Technology Integration Coordinator

Monitoring and Evaluation

Type: Proposed contracted service (Funded as part of Professional Development)

Responsibilities

- Develops and implements a plan for measuring the success of the use of technology for improving student learning.
- Evaluates districts technology strengths, resources, and needs.
- Creates and implements professional development program evaluation to assess effectiveness and inform future planning

Technology Coordinators

Type: Existing stipend positions

Responsibilities

- Serves as technology liaison between the building personnel and district technology services.
- Performs as a member of a team in the routine inspection of assigned building level computer and network hardware and software installation, maintenance and diagnostics
- Takes action to remedy malfunctions.
- Provides user support and assistance in troubleshooting of local area network